TSG-RAN Meeting #14
Kyoto, Japan, 11 - 14 December 2001

RP-010766

Title: **Agreed CRs (Release '99 and Rel-4 category A) to TS 25.331 (4)**
Source: **TSG-RAN WG2**
Agenda item: **8.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio
R2-012716	agreed	25.331	1171	1	R99	Handling of IE "frequency info"	F	3.8.0	3.9.0
R2-012759	agreed	25.331	1172		Rel-4	Handling of IE "frequency info"	A	4.2.1	4.3.0
R2-012717	agreed	25.331	1173	1	R99	Correction to Radio Bearer Release	F	3.8.0	3.9.0
R2-012718	agreed	25.331	1174		Rel-4	Correction to Radio Bearer Release	A	4.2.1	4.3.0
R2-012719	agreed	25.331	1177	1	R99	Correction to RACH reporting	F	3.8.0	3.9.0
R2-012760	agreed	25.331	1178		Rel-4	Correction to RACH reporting	A	4.2.1	4.3.0
R2-012555	agreed	25.331	1179		R99	Correction to URA/Cell update and other minor corrections	F	3.8.0	3.9.0
R2-012720	agreed	25.331	1180		Rel-4	Correction to URA/Cell update and other minor corrections	A	4.2.1	4.3.0
R2-012721	agreed	25.331	1181	1	R99	Correction to Active Set Update	F	3.8.0	3.9.0
R2-012722	agreed	25.331	1182		Rel-4	Correction to Active Set Update	A	4.2.1	4.3.0
R2-012727	agreed	25.331	1183	1	R99	Correction of Traffic Volume Measurement Criteria	F	3.8.0	3.9.0
R2-012728	agreed	25.331	1184		Rel-4	Correction of Traffic Volume Measurement Criteria	A	4.2.1	4.3.0
R2-012755	agreed	25.331	1185	3	R99	Correction of UE Positioning	F	3.8.0	3.9.0
R2-012756	agreed	25.331	1186		Rel-4	Correction of UE Positioning	A	4.2.1	4.3.0
R2-012730	agreed	25.331	1202	1	R99	Invalid RRC CONNECTION REJECT	F	3.8.0	3.9.0
R2-012731	agreed	25.331	1203		Rel-4	Invalid RRC CONNECTION REJECT	A	4.2.1	4.3.0
R2-012752	agreed	25.331	1213	1	R99	Security baseline for corrections	F	3.8.0	3.9.0
R2-012770	agreed	25.331	1214		Rel-4	Security baseline for corrections	A	4.2.1	4.3.0
R2-012750	agreed	25.331	1219		R99	Pending integrity protection activation time for UL RB0	F	3.8.0	3.9.0
R2-012769	agreed	25.331	1220		Rel-4	Pending integrity protection activation time for UL RB0	A	4.2.1	4.3.0

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Tdoc R2-012716

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1171** ⌘ ev **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Handling of IE "frequency info"
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19 Nov 01
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘

The IE 'frequency info' may be included in the reconfiguration and Cell Update Confirm messages. The handling of this IE is described in different places:

1 - The generic handling of this IE as specified in clause 8.6.6.1 says that the UE shall 'tune to that frequency'. The text seems to relevant for Cell_DCH only.

2 - Section 8.2.2.3 specifies how this IE is handled if it is included in a reconfiguration message that causes a state transition to Cell_PCH, URA_PCH, or CELL_FACH states. The UE should select a cell on the indicated frequency, and depending on the cell selected perform a cell update procedure.

However, the following cases are not specified other than by the generic handling in section 8.6.6.1:

1 - Reception of the IE in a reconfiguration message when the UE is already in CELL_FACH state and remains in CELL_FACH state

2 - Reception of the IE in Cell Update Confirm

Summary of change: ⌘

1 - It is stated that the generic handling of the IE described in section 8.6.6.1 is only applicable for Cell_DCH state (all other cases are handled explicitly in the procedure descriptions).

2 - When the IE is received in CELL_FACH state and the UE is remaining in CELL_FACH state, it is stated that the UE should select a cell on that frequency and perform a cell update if necessary.

3 - When the IE is received in Cell Update Confirm, the UE should select a cell on that frequency and send a cell update on the new cell, in the same way as for a cell reselection occurring before the Cell Update Procedure completes. The IE 'frequency info' is the only IE from the Cell Update Confirm that is processed -

		other IEs are ignored. **Isolated Impact Analysis** Functionality corrected: Handling of IE 'frequency info' Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	Without this CR the handling of the IE 'frequency info' will be unspecified in some cases. If this IE is received in then different UE implementations will have unpredictable behaviour.

Clauses affected:	⌘	8.2.2.3, 8.3.1.6, 8.6.6.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1172
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or
- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or
- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- perform the physical layer synchronisation procedure as specified in [29];
- act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
  - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
  - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- remove any C-RNTI from MAC;
- clear the variable C_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

If the UE was in CELL_FACH state upon reception of the reconfiguration message and remains in CELL_FACH state, the UE shall:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
  - if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received

reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):

- initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
- when the cell update procedure completed successfully:
  - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - re-establish RB2;
  - increment by one the downlink and uplink HFN values for RB2;
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;
    - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
  - if prior to this procedure there exist no transparent mode RLC radio bearers:
    - if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
    - if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
      - include the IE "COUNT-C activation time" and specify a CFN value other than the default, "Now", for this IE;
  - if prior to this procedure there exists at least one transparent mode RLC radio bearer:
    - if, at the conclusion of this procedure, no transparent mode RLC radio bearers exist:
      - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now", for this IE;
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" according to subclause 8.6.6.26;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state from CELL_DCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - the procedure ends;
- if the UE enters CELL_PCH state from CELL_FACH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure is successfully completed:
    - the procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:

- initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
- when the URA update procedure is successfully completed:
  - the procedure ends.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:

  - if the IE "Frequency info" is included in the message:
    - if the IE "RRC State Indicator" is set to the value "CELL_FACH" or "CELL_PCH" or URA_PCH":
      - select a suitable UTRA cell according to [4] on that frequency;
      - act as specified in section 8.3.1.12;
    - if the IE "RRC State Indicator" is set to the value "CELL_DCH":
      - act on the IE "Frequency info" as specified in section 8.6.6.1;
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
  - for radio bearers with RB identity larger than 4:
    - re-establish the AM RLC entities;
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
      - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;
- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

- If the UE after the state transition remains in CELL_FACH state and;
  - the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:

- abort the ongoing integrity and/or ciphering reconfiguration;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a URA update procedure:
  - stop the URA update procedure; and
  - continue with a cell update procedure;
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.

8.6.6.1 Frequency info

If, after completion of the procedure, the UE will be in cell CELL_DCH state:

- if the IE "Frequency info" is included the UE shall: [Hans: Style changed to B1]
  - store that frequency as the active frequency; and [Hans: Style changed to B2]
  - tune to that frequency.[Hans: Style changed to B2]
- if the IE "Frequency info" is not included and the UE has a stored active frequency, the UE shall: [Hans: Style changed to B1]
  - continue to use the stored active frequency. [Hans: Style changed to B2]

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc R2-012759

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1172** ⌘ ev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Handling of IE "frequency info"
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19 Nov 01
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

The IE 'frequency info' may be included in the reconfiguration and Cell Update Confirm messages. The handling of this IE is described in different places:

1 - The generic handling of this IE as specified in clause 8.6.6.1 says that the UE shall 'tune to that frequency'. The text seems to relevant for Cell_DCH only.

2 - Section 8.2.2.3 specifies how this IE is handled if it is included in a reconfiguration message that causes a state transition to Cell_PCH, URA_PCH, or CELL_FACH states. The UE should select a cell on the indicated frequency, and depending on the cell selected perform a cell update procedure.

However, the following cases are not specified other than by the generic handling in section 8.6.6.1:

1 - Reception of the IE in a reconfiguration message when the UE is already in CELL_FACH state and remains in CELL_FACH state

2 - Reception of the IE in Cell Update Confirm

Summary of change: ⌘

1 - It is stated that the generic handling of the IE described in section 8.6.6.1 is only applicable for Cell_DCH state (all other cases are handled explicitly in the procedure descriptions).

2 - When the IE is received in CELL_FACH state and the UE is remaining in CELL_FACH state, it is stated that the UE should select a cell on that frequency and perform a cell update if necessary.

3 - When the IE is received in Cell Update Confirm, the UE should select a cell on that frequency and send a cell update on the new cell, in the same way as for a cell reselection occurring before the Cell Update Procedure completes. The IE 'frequency info' is the only IE from the Cell Update Confirm that is processed -

		other IEs are ignored. **Isolated Impact Analysis** Functionality corrected: Handling of IE 'frequency info' Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	Without this CR the handling of the IE 'frequency info' will be unspecified in some cases. If this IE is received in then different UE implementations will have unpredictable behaviour.

Clauses affected:	⌘	8.2.2.3, 8.3.1.6, 8.6.6.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1171r1
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or
- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or
- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- perform the physical layer synchronisation procedure as specified in [29];
- act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
  - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
  - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- remove any C-RNTI from MAC;
- clear the variable C_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

If the UE was in CELL_FACH state upon reception of the reconfiguration message and remains in CELL_FACH state, the UE shall:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
  - if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received

reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):

- initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
- when the cell update procedure completed successfully:
  - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - re-establish RB2;
  - increment by one the downlink and uplink HFN values for RB2;
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;
    - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
  - if prior to this procedure there exist no transparent mode RLC radio bearers:
    - if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
    - if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
      - include the IE "COUNT-C activation time" and specify a CFN value other than the default, "Now", for this IE;
  - if prior to this procedure there exists at least one transparent mode RLC radio bearer:
    - if, at the conclusion of this procedure, no transparent mode RLC radio bearers exist:
      - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now", for this IE;
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and

- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" according to subclause 8.6.6.26;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state from CELL_DCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - the procedure ends;
- if the UE enters CELL_PCH state from CELL_FACH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure is successfully completed:
    - the procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:

- initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
- when the URA update procedure is successfully completed:
  - the procedure ends.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:

  - if the IE "Frequency info" is included in the message:
    - if the IE "RRC State Indicator" is set to the value "CELL_FACH" or "CELL_PCH" or URA_PCH":
      - select a suitable UTRA cell according to [4] on that frequency;
      - act as specified in section 8.3.1.12;
    - if the IE "RRC State Indicator" is set to the value "CELL_DCH":
      - act on the IE "Frequency info" as specified in section 8.6.6.1;
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;

- if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
  - for radio bearers with RB identity larger than 4:
    - re-establish the AM RLC entities;
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
      - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;
- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

- If the UE after the state transition remains in CELL_FACH state and;
  - the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:

- abort the ongoing integrity and/or ciphering reconfiguration;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a URA update procedure:
  - stop the URA update procedure; and
  - continue with a cell update procedure;
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.

8.6.6.1 Frequency info

If, after completion of the procedure, the UE will be in cell CELL_DCH state:

- if the IE "Frequency info" is included the UE shall: [Hans: Style changed to B1]
  - store that frequency as the active frequency; and [Hans: Style changed to B2]
  - tune to that frequency.[Hans: Style changed to B2]
- if the IE "Frequency info" is not included and the UE has a stored active frequency, the UE shall: [Hans: Style changed to B1]
  - continue to use the stored active frequency. [Hans: Style changed to B2]

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, November 26-30, 2001

Tdoc R2-012717

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1173** ⌘ **rev** **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to Radio Bearer Release
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	November 26, 2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	1. In the present Radio Bearer Release message it is possible to include the release of Signalling Radio Bearers less than 4 as well. However this if not followed with a RRC Connection Release leads to a erroneous configuration wherein the UE has only a RRC Connection and no SRBs to communicate with the NW. There is no behaviour described for the release of Signalling Radio Bearers (greater than 3).
Summary of change:	⌘	It is clarified that the NW should not include the release of SRBs in the Radio Bearer Release message. Inclusion by the NW should lead to a invalid configuration. 1 - In section 8.6.4.6 a check on the RB identity is added and the variable INVALID_CONFIGURATION set true if the RB identity is less than 4. 2 - The UE behaviour in the case that a signalling radio bearer is release is added. 3 - A redundant sentence in 8.6.4.6 is deleted.
Consequences if not approved:	⌘	The UE would be in a configuration that is not useful in that it is unable to send any messages but the upper layers in the UE would assume that with the RRC Connection present RRC is able to send NAS messages to the NW.

Clauses affected:	⌘	8.6.4.6		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1174
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.4.6 RB information to release

If the IE "RB information to release" is included, the UE shall apply the following actions on the radio bearer identified with the value of the IE "RB identity". The UE shall:

- if the IE "RB identity" is set to a value less than 4:
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the IE "RB identity" refers to a signalling radio bearer:
  - release the RLC entity for the signalling radio bearer;
  - delete the information about the signalling radio bearer from the variable ESTABLISHED_RABS;
- if the IE "RB identity" refers to a radio bearer:
  - release the PDCP and RLC entities ~~dedicated~~ for that radio bearer;
  - ~~if the information about the radio bearer is stored in the variable ESTABLISHED_RABS:~~
    - indicate release of the RAB subflow associated with the radio bearer to upper layers;
    - delete the information about the radio bearer from the variable ESTABLISHED_RABS;
    - when all radio bearers belonging to the same radio access bearer have been released:
      - indicate release of the radio access bearer to upper layers providing the "CN domain identity" together with the "RAB identity" stored in the variable ESTABLISHED_RABS;
      - delete all information about the radio access bearer from the variable ESTABLISHED_RABS.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, November 26-30, 2001

Tdoc R2-012718

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1174** ⌘ **rev** **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to Radio Bearer Release
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	November 26, 2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	1. In the present Radio Bearer Release message it is possible to include the release of Signalling Radio Bearers less than 4 as well. However this if not followed with a RRC Connection Release leads to a erroneous configuration wherein the UE has only a RRC Connection and no SRBs to communicate with the NW. There is no behaviour described for the release of Signalling Radio Bearers (greater than 3).
Summary of change:	⌘	It is clarified that the NW should not include the release of SRBs in the Radio Bearer Release message. Inclusion by the NW should lead to a invalid configuration. 1 - In section 8.6.4.6 a check on the RB identity is added and the variable INVALID_CONFIGURATION set true if the RB identity is less than 4. 2 - The UE behaviour in the case that a signalling radio bearer is release is added. 3 - A redundant sentence in 8.6.4.6 is deleted.
Consequences if not approved:	⌘	The UE would be in a configuration that is not useful in that it is unable to send any messages but the upper layers in the UE would assume that with the RRC Connection present RRC is able to send NAS messages to the NW.

Clauses affected:	⌘	8.6.4.6		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1173r1
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.4.6 RB information to release

If the IE "RB information to release" is included, the UE shall apply the following actions on the radio bearer identified with the value of the IE "RB identity". The UE shall:

- if the IE "RB identity" is set to a value less than 4:
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the IE "RB identity" refers to a signalling radio bearer:
  - release the RLC entity for the signalling radio bearer;
  - delete the information about the signalling radio bearer from the variable ESTABLISHED_RABS;
- if the IE "RB identity" refers to a radio bearer:
  - release the PDCP and RLC entities ~~dedicated~~ for that radio bearer;
  - ~~if the information about the radio bearer is stored in the variable ESTABLISHED_RABS:~~
    - indicate release of the RAB subflow associated with the radio bearer to upper layers;
    - delete the information about the radio bearer from the variable ESTABLISHED_RABS;
    - when all radio bearers belonging to the same radio access bearer have been released:
      - indicate release of the radio access bearer to upper layers providing the "CN domain identity" together with the "RAB identity" stored in the variable ESTABLISHED_RABS;
      - delete all information about the radio access bearer from the variable ESTABLISHED_RABS.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc r2-012719

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1177** ⌘ ev **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to RACH reporting
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/11/01
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

Currently sections 8.1.1.6.11 (desciption of SIB11) and 8.4.1.9a.1 (measurements after transition to idle mode) do not state that the UE needs to perform RACH reporting in idle mode. However, the description of the RRC Connection Establishment procedure does specify the inclusion of a measurement report in the RRC Connection Request message sent on RACH. Therefore the spec could be interpreted that RACH reporting in idle mode is not required. (Note: it is clear from 8.1.1.6.12 (description of SIB12) that RACH reporting is required in connected mode)

For connected mode states (CELL_FACH/URA_PCH/CELL_PCH) it explicitly states that the UE should perform RACH reporting according to the IEs "Intra-frequency reporting quantity for RACH Reporting" and "Maximum number of Reported cells on RACH" after a state transition to these states. This could imply that the UE performs RACH reporting according to information received from the first cell selected after a state transition, and not changed after cell reselection. This text could lead to ambiguity.

Summary of change: ⌘

It is proposed that:

- the text relating to RACH reporting in the state transitions described in 8.4 is deleted.

- the handling of the IE for RACH reporting is described in 8.1.1.6.11

Isolated Impact Analysis
Functionality corrected: RACH reporting

		Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	The specification will be unclear as to whether RACH reporting is required in idle mode.

Clauses affected:	⌘	8.1.1.6.11, 8.4.1.6.1, 8.4.1.9.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1178
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.1.1.6.11 System Information Block type 11

The UE should store all relevant IEs included in this system information block. The UE shall:

- if IE "FACH measurement occasion info" is included:
  - act as specified in subclause 8.6.7.
- else:
  - may perform inter-frequency/inter-RAT measurements or inter-frequency/inter-RAT cell re-selection evaluation, if the UE capabilities permit such measurements while simultaneously receiving the S-CCPCH of the serving cell;
- if in connected mode, and System Information Block type 12 is indicated as used in the cell:
  - read and act on information sent in System Information Block type 12;
- for each measurement type:
  - start a measurement using the set of IEs specified for that measurement type;
- associate each measurement with the identity number given by the IE "Measurement identity";
- clear the variable CELL_INFO_LIST;
- act upon the received IE "Intra-frequency/Inter-frequency/Inter-RAT cell info list" as described in subclause 8.6.7.3;
- if included, store the IE "Intra-frequency reporting quantity" and the IE "Intra-frequency measurement reporting criteria" or "Periodical reporting criteria" in order to activate reporting when state CELL_DCH is entered;
- if IE "Use of HCS" is set to "used", indicating that HCS is used, do the following:
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Intra-frequency cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Intra-frequency cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Intra-frequency cell info list";
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Inter-frequency cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Inter-frequency cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Inter-frequency cell info list";
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Inter-RAT Cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Inter-RAT cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Inter-RAT cell info list";
- if the value of the IE "Cell selection and reselection quality measure" is different from the value of the IE "Cell selection and reselection quality measure" obtained from System Information Block type 3 or System Information Block type 4:

- use the value of the IE from this System Information Block and ignore the value obtained from System Information Block type 3 or System Information Block type 4.

- if the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" are included:

  - use this information for reporting measured results in RACH messages.

8.4.1.6 Measurements after transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state:

8.4.1.6.1 Intra-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop intra-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type intra-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

~~- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" IEs from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):~~

~~- use this information for reporting measured results in RACH messages.~~

8.4.1.9 Measurements after transition from idle mode to CELL_FACH state

The UE shall obey the follow rules for different measurement types after transiting from idle mode to CELL_FACH state:

8.4.1.9.1 Intra-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

~~- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and IE "Maximum number of Reported cells on RACH" from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):~~

~~- use this information for reporting measured results in RACH messages.~~

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc R2-012760

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1178** ⌘ ev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to RACH reporting
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/11/01
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

Currently sections 8.1.1.6.11 (desciption of SIB11) and 8.4.1.9a.1 (measurements after transition to idle mode) do not state that the UE needs to perform RACH reporting in idle mode. However, the description of the RRC Connection Establishment procedure does specify the inclusion of a measurement report in the RRC Connection Request message sent on RACH. Therefore the spec could be interpreted that RACH reporting in idle mode is not required. (Note: it is clear from 8.1.1.6.12 (description of SIB12) that RACH reporting is required in connected mode)

For connected mode states (CELL_FACH/URA_PCH/CELL_PCH) it explicitly states that the UE should perform RACH reporting according to the IEs "Intra-frequency reporting quantity for RACH Reporting" and "Maximum number of Reported cells on RACH" after a state transition to these states. This could imply that the UE performs RACH reporting according to information received from the first cell selected after a state transition, and not changed after cell reselection. This text could lead to ambiguity.

Summary of change: ⌘

It is proposed that:

- the text relating to RACH reporting in the state transitions described in 8.4 is deleted.

- the handling of the IE for RACH reporting is described in 8.1.1.6.11

Isolated Impact Analysis
Functionality corrected: RACH reporting

		Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	The specification will be unclear as to whether RACH reporting is required in idle mode.

Clauses affected:	⌘	8.1.1.6.11, 8.4.1.6.1, 8.4.1.9.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1177r1
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.1.1.6.11 System Information Block type 11

The UE should store all relevant IEs included in this system information block. The UE shall:

- if IE "FACH measurement occasion info" is included:
  - act as specified in subclause 8.6.7.
- else:
  - may perform inter-frequency/inter-RAT measurements or inter-frequency/inter-RAT cell re-selection evaluation, if the UE capabilities permit such measurements while simultaneously receiving the S-CCPCH of the serving cell;
- if in connected mode, and System Information Block type 12 is indicated as used in the cell:
  - read and act on information sent in System Information Block type 12;
- for each measurement type:
  - start a measurement using the set of IEs specified for that measurement type;
- associate each measurement with the identity number given by the IE "Measurement identity";
- clear the variable CELL_INFO_LIST;
- act upon the received IE "Intra-frequency/Inter-frequency/Inter-RAT cell info list" as described in subclause 8.6.7.3;
- if included, store the IE "Intra-frequency reporting quantity" and the IE "Intra-frequency measurement reporting criteria" or "Periodical reporting criteria" in order to activate reporting when state CELL_DCH is entered;
- if IE "Use of HCS" is set to "used", indicating that HCS is used, do the following:
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Intra-frequency cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Intra-frequency cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Intra-frequency cell info list";
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Inter-frequency cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Inter-frequency cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Inter-frequency cell info list";
  - if IE "HCS neighbouring cell information" is not included in the first occurrence of IE "Inter-RAT Cell info list":
    - use the default values specified for the IE "HCS neighbouring cell information" for that cell;
  - if IE "HCS neighbouring cell information" is not included in other occurrence of IE "Inter-RAT cell info list":
    - for that cell use the same parameter values as used for the preceding IE "Inter-RAT cell info list";
- if the value of the IE "Cell selection and reselection quality measure" is different from the value of the IE "Cell selection and reselection quality measure" obtained from System Information Block type 3 or System Information Block type 4:

- use the value of the IE from this System Information Block and ignore the value obtained from System Information Block type 3 or System Information Block type 4.

- if the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" are included:

  - use this information for reporting measured results in RACH messages.

8.4.1.6 Measurements after transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state:

8.4.1.6.1 Intra-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop intra-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type intra-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

~~- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" IEs from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):~~

~~- use this information for reporting measured results in RACH messages.~~

8.4.1.9 Measurements after transition from idle mode to CELL_FACH state

The UE shall obey the follow rules for different measurement types after transiting from idle mode to CELL_FACH state:

8.4.1.9.1 Intra-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

~~- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and IE "Maximum number of Reported cells on RACH" from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):~~

~~- use this information for reporting measured results in RACH messages.~~

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc R2-012555

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1179** ⌘ ev **-** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to URA/Cell update and other minor corrections
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19 Nov 2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	1 - Section 8.1.3.10 only relates to the UE handling of URA update confirm message in the case of confirmation error of URA ID list. However, some of the text in the section incorrectly references a received Cell Update Confirm message. 2 - Section 8.3.1.2, contains some incorrect indentations. The case where T314 has elapsed while T302 is running and the case wherer T315 has elapsed with T302 running should not be sub-cases of T314 **and** T315 having elapsed with T302 still running, as in the current version 3 - Section 4 contains some editorial errors. 4 - The UE variable descriptions in 13.4.27g and 13.4.28 have an editorial error where some semantic descriptions in the wrong row.
Summary of change:	⌘	1 - Reference to Cell Update Confirm message deleted from section 8.1.3.10 2 - Indentations corrected **Isolated Impact Analysis** Functionality corrected: URA/Cell update Isolated impact statement: Correction to a function where specification was not sufficiently explicit. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. Corrections 3 and 4 are editorial and don't have any functional impact.
Consequences if not approved:	⌘	If not agreed, the specification would continue to be in sufficiently explicit.

Clauses affected:	⌘	4.1, 8.3.1.10, 8.3.1.12, 13.4.27g, 13.4.28		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1180
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.3.1.10 Confirmation error of URA ID list

If the URA UPDATE CONFIRM message causes a confirmation error of URA identity list as specified in subclause 8.6.2.1 the UE shall:

- check the value of V302; and
- if V302 is smaller or equal than N302:
  - if, caused by the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message contained the IE "Integrity protection mode info"
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - set the IEs in the URA UPDATE message according to subclause 8.3.1.3;
  - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302:
  - release all its radio resources;
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - set the variable CELL_UPDATE_STARTED to FALSE;
  - enter idle mode;
  - perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode;
  - the procedure ends.

8.3.1.12 T302 expiry or cell reselection

If any or several of the following conditions are true:

- expiry of timer T302;
- reselection to another UTRA cell (including the previously serving cell) before completion of the cell update or URA update procedure;

the UE shall:

- stop T302 if it is running;
- if the UE was in CELL_DCH state prior to the initiation of the procedure; and
  - if timers T314 and T315 have elapsed while T302 was running:
    - enter idle mode.
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.
    - and the procedure ends.
  - if timer T314 has elapsed while T302 was running and, [Hans: This bullet and following 13 are shifted one place left]
    - if "T314 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and
    - if T315 is still running:
      - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
      - indicate release of those radio access bearers to upper layers;
      - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
      - set "T314 expired" in the variable RB_TIMER_INDICATOR to TRUE;
  - if timer T315 has elapsed while T302 was running and,
    - if "T315 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and,
    - if T314 is still running:
      - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT315";
      - indicate release of those radio access bearers to upper layers;
      - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
      - set "T315 expired" in the variable RB_TIMER_INDICATOR to TRUE; [Hans - last bullet that has been shifted one place left]
- check whether it is still in "in service area" (see subclause 8.5.5.2);
- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE and/or the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
  - abort the ongoing integrity and/or ciphering reconfiguration;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- in case of a cell update procedure:
  - clear any entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear any entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

If the UE detects "in service area" if it has not entered idle mode, and:

- if V302 is equal to or smaller than N302, the UE shall:
  - if the UE performed cell re-selection:
    - delete its C-RNTI;
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302, the UE shall:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:

- clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;

- release all its radio resources;

- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;

- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;

- clear the variable ESTABLISHED_RABS;

- set the variable CELL_UPDATE_STARTED to FALSE;

- enter idle mode;

- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;

- and the procedure ends.

If the UE does not detect "in service area", it shall:

- continue searching for "in service area".

4.1 Overview of the specification

This specification is organised as follows:

- Subclause 4.2 contains the description of the model of the RRC protocol layer;
- Clause 5 lists the RRC functions and the services provided to upper layers;
- Clause 6 lists the services expected from the lower layers and specifies the radio bearers available for usage by the RRC messages;
- Clause 7 specifies the UE states for the Access Stratum, and also specifies the processes running in the UE in the respective states;
- Clause 8 specifies RRC procedures, including UE state transitions;
- Clause 9 specifies the procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity;
- Clause 10 describes the message in a Tabular format; these messages descriptions are referenced in clause 8;
- Clause 11 specifies the encoding of the messages of the RRC protocol. This is based on the Tabular description in clause 10.
- Clause 12 specifies the transfer syntax for RRC PDUs derived from the encoding definition;
- Clause 13 lists the protocol timers, counters, constants and variables to be used by the UE;
- Clause 14 specifies some of the processes applicable in UTRA RRC connected mode e.g. measurement processes, and also the RRC information to be transferred between network nodes. Note that not all the processes applicable in UTRA RRC connected mode are specified here i.e. some UTRA RRC connected mode processes are described in [4] e.g. cell re-selection;
- Annex A contains recommendations about the network parameters to be stored on the USIM;
- Annex B contains informative Stage 2 description of the RRC protocol states and state transitions.[Hans: Style changed to B1]

The following figure summarises the mapping of UE states, including states in GSM, to the appropriate UTRA and GSM specifications that specify the UE behaviour.

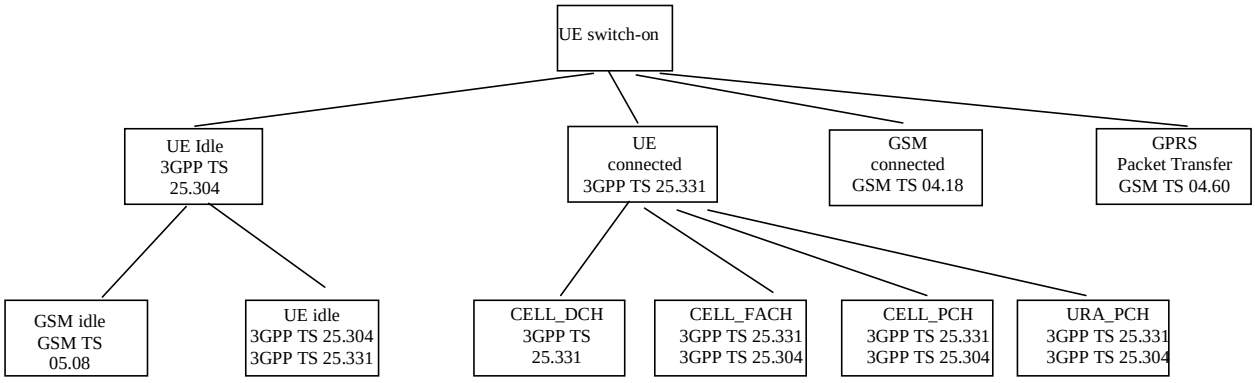

Figure 1: Mapping of UE state to 3GPP Specifications

13.4.27g UE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to < maxInterSysMessages >	~~Inter-RAT UE radio access capability 10.3.8.7~~	~~Includes inter-RAT classmark.~~ ~~Cleared when entering UTRA RRC connected mode.~~ ~~Cleared when leaving UTRA RRC connected mode.~~
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to <maxSystemCapability>	~~Inter-RAT UE radio access capability 10.3.8.7~~	~~Includes inter-RAT classmark.~~ ~~Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure.~~ ~~Cleared when leaving UTRA RRC connected mode.~~
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc R2-012720

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1180** ⌘ ev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to URA/Cell update and other minor corrections
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19 Nov 2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change:	⌘	1 - Section 8.1.3.10 only relates to the UE handling of URA update confirm message in the case of confirmation error of URA ID list. However, some of the text in the section incorrectly references a received Cell Update Confirm message. 2 - Section 8.3.1.2, contains some incorrect indentations. The case where T314 has elapsed while T302 is running and the case wherer T315 has elapsed with T302 running should not be sub-cases of T314 **and** T315 having elapsed with T302 still running, as in the current version 3 - Section 4 contains some editorial errors. 4 - The UE variable descriptions in 13.4.27g and 13.4.28 have an editorial error where some semantic descriptions in the wrong row.
Summary of change:	⌘	1 - Reference to Cell Update Confirm message deleted from section 8.1.3.10 2 - Indentations corrected **Isolated Impact Analysis** Functionality corrected: URA/Cell update Isolated impact statement: Correction to a function where specification was not sufficiently explicit. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. Corrections 3 and 4 are editorial and don't have any functional impact.
Consequences if not approved:	⌘	If not agreed, the specification would continue to be in sufficiently explicit.

Clauses affected:	⌘	4.1, 8.3.1.10, 8.3.1.12, 13.4.27g, 13.4.28		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1179
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.3.1.10 Confirmation error of URA ID list

If the URA UPDATE CONFIRM message causes a confirmation error of URA identity list as specified in subclause 8.6.2.1 the UE shall:

- check the value of V302; and
- if V302 is smaller or equal than N302:
  - if, caused by the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received ~~CELL UPDATE CONFIRM or~~ URA UPDATE CONFIRM message contained the IE "Integrity protection mode info"
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - set the IEs in the URA UPDATE message according to subclause 8.3.1.3;
  - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302:
  - release all its radio resources;
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - set the variable CELL_UPDATE_STARTED to FALSE;
  - enter idle mode;
  - perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode;
  - the procedure ends.

8.3.1.12 T302 expiry or cell reselection

If any or several of the following conditions are true:

- expiry of timer T302;
- reselection to another UTRA cell (including the previously serving cell) before completion of the cell update or URA update procedure;

the UE shall:

- stop T302 if it is running;
- if the UE was in CELL_DCH state prior to the initiation of the procedure; and
  - if timers T314 and T315 have elapsed while T302 was running:
    - enter idle mode.
    - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.
    - and the procedure ends.
  - if timer T314 has elapsed while T302 was running and, [Hans: This bullet and following 13 are shifted one place left]
    - if "T314 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and
    - if T315 is still running:
      - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT314";
      - indicate release of those radio access bearers to upper layers;
      - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
      - set "T314 expired" in the variable RB_TIMER_INDICATOR to TRUE;
  - if timer T315 has elapsed while T302 was running and,
    - if "T315 expired" in the variable RB_TIMER_INDICATOR is set to FALSE and,
    - if T314 is still running:
      - release locally all radio bearers which are associated with any radio access bearers for which in the variable ESTABLISHED_RABS the value of the IE "Re-establishment timer" is set to "useT315";
      - indicate release of those radio access bearers to upper layers;
      - delete all information about those radio access bearers from the variable ESTABLISHED_RABS;
      - set "T315 expired" in the variable RB_TIMER_INDICATOR to TRUE; [Hans - last bullet that has been shifted one place left]
- check whether it is still in "in service area" (see subclause 8.5.5.2);
- if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE and/or the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
  - abort the ongoing integrity and/or ciphering reconfiguration;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- in case of a cell update procedure:
  - clear any entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear any entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS;

If the UE detects "in service area" if it has not entered idle mode, and:

- if V302 is equal to or smaller than N302, the UE shall:
  - if the UE performed cell re-selection:
    - delete its C-RNTI;
  - in case of a cell update procedure:
    - set the contents of the CELL UPDATE message according to subclause 8.3.1.3;
    - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - in case of a URA update procedure:
    - set the contents of the URA UPDATE message according to subclause 8.3.1.3;
    - submit the URA UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- if V302 is greater than N302, the UE shall:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - clear the variable PDCP_SN_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:

- clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;

- release all its radio resources;

- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;

- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;

- clear the variable ESTABLISHED_RABS;

- set the variable CELL_UPDATE_STARTED to FALSE;

- enter idle mode;

- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;

- and the procedure ends.

If the UE does not detect "in service area", it shall:

- continue searching for "in service area".

4.1 Overview of the specification

This specification is organised as follows:

- Subclause 4.2 contains the description of the model of the RRC protocol layer;
- Clause 5 lists the RRC functions and the services provided to upper layers;
- Clause 6 lists the services expected from the lower layers and specifies the radio bearers available for usage by the RRC messages;
- Clause 7 specifies the UE states for the Access Stratum, and also specifies the processes running in the UE in the respective states;
- Clause 8 specifies RRC procedures, including UE state transitions;
- Clause 9 specifies the procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity;
- Clause 10 describes the message in a Tabular format; these messages descriptions are referenced in clause 8;
- Clause 11 specifies the encoding of the messages of the RRC protocol. This is based on the Tabular description in clause 10.
- Clause 12 specifies the transfer syntax for RRC PDUs derived from the encoding definition;
- Clause 13 lists the protocol timers, counters, constants and variables to be used by the UE;
- Clause 14 specifies some of the processes applicable in UTRA RRC connected mode e.g. measurement processes, and also the RRC information to be transferred between network nodes. Note that not all the processes applicable in UTRA RRC connected mode are specified here i.e. some UTRA RRC connected mode processes are described in [4] e.g. cell re-selection;
- Annex A contains recommendations about the network parameters to be stored on the USIM;
- Annex B contains informative Stage 2 description of the RRC protocol states and state transitions.[Hans: Style changed to B1]

The following figure summarises the mapping of UE states, including states in GSM, to the appropriate UTRA and GSM specifications that specify the UE behaviour.

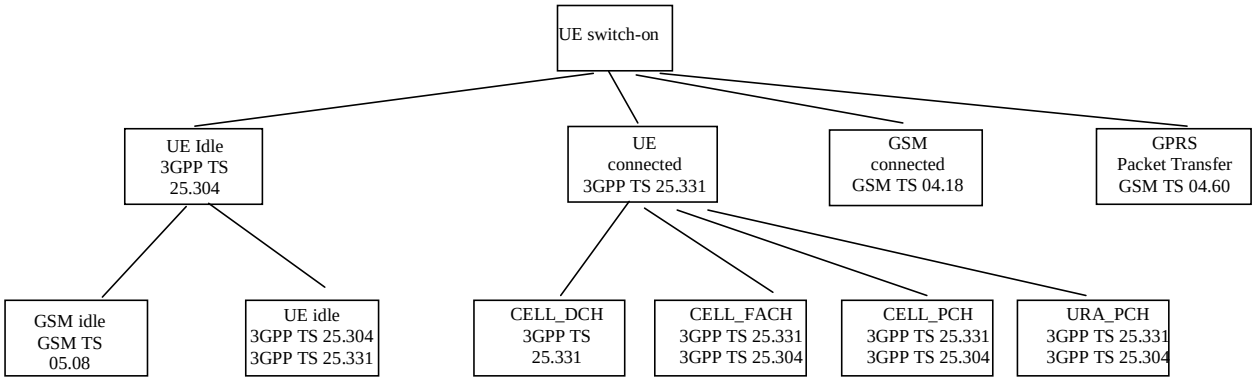

Figure 1: Mapping of UE state to 3GPP Specifications

13.4.27g UE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to < maxInterSysMessages >	~~Inter-RAT UE radio access capability 10.3.8.7~~	~~Includes inter-RAT classmark.~~ ~~Cleared when entering UTRA RRC connected mode.~~ ~~Cleared when leaving UTRA RRC connected mode.~~
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to <maxSystemCapability>	~~Inter-RAT UE radio access capability 10.3.8.7~~	~~Includes inter-RAT classmark.~~ ~~Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure.~~ ~~Cleared when leaving UTRA RRC connected mode.~~
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc r2-012721

CR-Form-v4

CHANGE REQUEST

⌘ **25.331** **CR** **1181** ⌘ ev **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Correction to active set update	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 19/11/01
Category: ⌘	**F**	***Release:*** ⌘ R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘

Parallel active set update procedures in the UE can cause some situation for which the UE behaviour is not currently defined:
- removal of a radio link that does not exist
- addition of radio links causing the active set to have more radio links than permitted

Summary of change: ⌘

The following UE behaviour is proposed
- UE ignores an IE indicating the removal of a RL that does not exist
- UE adds radio links in the order given in the message until the active set is full

Isolated Impact Analysis
Functionality corrected: Active set update

Isolated impact statement: Correction to a function where specification was missing procedural rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ The UE behaviour in some scenarios would be unspecified, leading to potential misalignment of active set between UE and UTRAN.

Clauses affected: ⌘ 8.3.4.5

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.331 v4.2.1, CR 1182
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.3.4.5 Invalid configuration

If any of the following conditions are valid:

- a radio link indicated by the IE "Downlink DPCH info for each RL" in the IE "Radio link addition information" has a different spreading factor than the spreading factor for the radio links in the active set that will be established at the time indicated by the IE "Activation time"; and/or
- a radio link in the IE "Radio link addition information" is also present in the IE "Radio Link Removal Information"; and/or
- the IE "Radio Link Removal Information" contains all the radio links which are part of or will be part of the active set at the time indicated by the IE "Activation time"; and/or
- a radio link indicated by the IE "Radio Link Removal Information" does not exist in the active set; and/or
- after the removal of all radio links indicated by the IE "Radio Link Removal Information" and the addition of all radio links indicated by the IE "Radio Link Addition Information" the active set would contain more than the maximum allowed number of radio links; and/or
- the variable INVALID_CONFIGURATION is set to TRUE:

the UE shall:

- keep the active set as it was before the ACTIVE SET UPDATE message was received;
- transmit an ACTIVE SET UPDATE FAILURE message on the DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE FAILURE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to "Invalid configuration";
- When the ACTIVE SET UPDATE FAILURE message has been submitted to lower layers for transmission:
  - the procedure ends on the UE side.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th-30th November 2001

Tdoc r2-012722

CR-Form-v4

CHANGE REQUEST

⌘ **25.331** **CR** **1182** ⌘ ev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction to active set update
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	19/11/01
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

Parallel active set update procedures in the UE can cause some situation for which the UE behaviour is not currently defined:
- removal of a radio link that does not exist
- addition of radio links causing the active set to have more radio links than permitted

Summary of change: ⌘

The following UE behaviour is proposed
- UE ignores an IE indicating the removal of a RL that does not exist
- UE adds radio links in the order given in the message until the active set is full

Isolated Impact Analysis
Functionality corrected: Active set update

Isolated impact statement: Correction to a function where specification was missing procedural rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ The UE behaviour in some scenarios would be unspecified, leading to potential misalignment of active set between UE and UTRAN.

Clauses affected: ⌘ 8.3.4.5

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.331 v3.8.0, CR 1181r1
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

How to create CRs using this form:

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request. ⌘

8.3.4.5 Invalid configuration

If any of the following conditions are valid:

- a radio link indicated by the IE "Downlink DPCH info for each RL" in the IE "Radio link addition information" has a different spreading factor than the spreading factor for the radio links in the active set that will be established at the time indicated by the IE "Activation time"; and/or
- a radio link in the IE "Radio link addition information" is also present in the IE "Radio Link Removal Information"; and/or
- the IE "Radio Link Removal Information" contains all the radio links which are part of or will be part of the active set at the time indicated by the IE "Activation time"; and/or
- a radio link indicated by the IE "Radio Link Removal Information" does not exist in the active set; and/or
- after the removal of all radio links indicated by the IE "Radio Link Removal Information" and the addition of all radio links indicated by the IE "Radio Link Addition Information" the active set would contain more than the maximum allowed number of radio links; and/or
- the variable INVALID_CONFIGURATION is set to TRUE:

the UE shall:

- keep the active set as it was before the ACTIVE SET UPDATE message was received;
- transmit an ACTIVE SET UPDATE FAILURE message on the DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE FAILURE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to "Invalid configuration";
- When the ACTIVE SET UPDATE FAILURE message has been submitted to lower layers for transmission:
  - the procedure ends on the UE side.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26-30 November 2001

Tdoc R2-012727

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1183** ⌘ **rev** **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction of Traffic Volume Measurement reporting criteri
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	26-11-2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ The IE " Parameters sent for each transport channel" included in "Traffic Volume Measurement reporting criteria" is Optional. However it seems that no scenario exists where this IE would not be included. Therefore, it is proposed to change its "need" to Mandatory.

Summary of change: ⌘ Clarification added that the IE " Parameters sent for each transport channel" shall always be included.

The correction proposed is done according to the guidelines in 25.921 for the case when an IE is specified erroneously as OP in ASN.1 but it should be MP. If this IE is absent then the UE shall consider it as a protocol error. The cause of the protocol error for this case is "Information Element missing".

This CR changes the naming of the protocol error "Conditional information error eror" to "Information Element missing" in order to cover also the case of corrections as proposed in this CR.

Isolated impact analysis:

corrected function: Traffic Volume Measurement reporting

- « Correction to a function where the specification was :
  - Procedural text or rules were missing.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. »

Consequences if not approved: ⌘ Traffic Volume Measurement Reporting specification is ambigous

Clauses affected:	⌘	8.6.7.11, 9.5, 10.3.3.26, 10.3.7.72, 11.3, 14.12.0a			
Other specs affected:	⌘	X	Other core specifications	⌘	25.331 v4.2.1, CR 1184
		X	Test specifications		
			O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.7.11 Traffic Volume Measurement Reporting Criteria

If the IE "Traffic Volume Measurement Reporting Criteria" is received by the UE, the UE shall:

- if the IE "Parameters sent for each transport channel" is absent:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element missing";
- store the content of the IE "Traffic Volume Measurement Reporting Criteria" to the variable MEASUREMENT_IDENTITY.

If the IE "UL transport channel id" is not included, the UE shall:

- apply the measurement reporting criteria to all uplink transport channels indicated in the IE "Traffic volume measurement object";
- if the UTRAN has not specified a traffic volume measurement object for a given measurement identity:
  - apply the measurement reporting criteria to all uplink transport channels that are configured for the current UE state.

If the IE "Tx interruption after trigger" is included, the UE shall:

- block DTCH transmissions on the RACH during the time specified in the IE after a measurement report is transmitted.

9.5 Conditional information element error

If the UE receives an RRC message on the DCCH, BCCH, PCCH, or addressed to the UE on the CCCH or on the SHCCH, or sent to the UE in an RRC information container via a radio access technology other than UTRAN, for which the specified conditions for absence of a conditional IE are met and that IE is present, the UE shall:

- ignore the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, or sent to the UE via a radio access technology other than UTRAN, for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "~~Conditional I~~information element missing~~error~~";
- perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the message.

10.3.3.26 Protocol error cause

This IE indicates the cause for a message or information that was not comprehended.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Protocol error cause	MP		Enumerated (ASN.1 violation or encoding error, Message type non-existent or not implemented, Message not compatible with receiver state, Information element value not comprehended, ~~Conditional li~~information element missing ~~error~~, Message extension not comprehended)	At least one spare value needed.

10.3.7.72 Traffic volume measurement reporting criteria

Contains the measurement reporting criteria information for a traffic volume measurement.

Event 4a: Transport Channel Traffic Volume [15] exceeds an absolute threshold.

Event 4b: Transport Channel Traffic Volume [15] becomes smaller than an absolute threshold.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Parameters sent for each transport channel	OP	1 to <maxTrCH>		This IE is always required, need is OP to align with ASN.1
>Uplink transport channel type	OP		Enumerated(DCH,RACHorCPCH,USCH)	USCH is TDD only. CPCH is FDD only. RACHorCPCH is the currently configured default in the uplink.
>UL Transport Channel ID	CV-*UL-DCH/USCH*		Transport channel identity 10.3.5.18	
>Parameters required for each Event	OP	1 to <maxMeasperEvent>		
>>Traffic volume event identity	MP		Traffic volume event identity 10.3.7.66	
>>Reporting Threshold	MP		Enumerated(8,16,32,64,128,256,512,1024,2K,3K,4K,6K,8K,12K,16K,24K,32K,48K,64K,96K,128K,192K,256K,384K,512K,768K)	Threshold in bytes And N Kbytes = N*1024 bytes
>>Time to trigger	OP		Time to trigger 10.3.7.64	Indicates the period of time between the timing of event detection and the timing of sending Measurement Report. Time in ms
>>Pending time after trigger	OP		Integer(250, 500, 1000, 2000, 4000, 8000, 16000)	Indicates the period of time during which it is forbidden to send any new measurement reports with the same Traffic volume event identity even if the triggering condition is fulfilled. Time in milliseconds
>>Tx interruption after trigger	OP		Integer (250, 500, 1000, 2000, 4000, 8000, 16000)	Time in milliseconds. Indicates how long the UE shall block DTCH transmissions on the RACH after a measurement report is triggered.

Condition	Explanation
UL-DCH/USCH	If IE "Uplink transport channel type" is equal to "DCH" or "USCH" (TDD only) this IE is optional. Otherwise the IE is not needed.

11.3 Information element definitions

```
...

-- ************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- ************************************************
...

ProtocolErrorCause ::=              ENUMERATED {
                                        asn1-ViolationOrEncodingError,
                                        messageTypeNonexistent,
                                        messageNotCompatibleWithReceiverState,
                                        ie-ValueNotComprehended,
                                        conditionalIinformationElementMissingError,
                                        messageExtensionNotComprehended,
                                        spare1, spare2 }



...

-- ************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- ************************************************

...


TrafficVolumeReportingCriteria ::= SEQUENCE {
    transChCriteriaList                 TransChCriteriaList                 OPTIONAL
--NOTE: IE "transChCriteriaList" should be mandatory in later versions of this message
}
```

14.12.0a General error handling for RRC information containers

The handling of RRC messages that are terminated in the UE and transferred using RRC information containers is covered by clauses 8 and 9 of this specification.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages, as specified in the following.

Although the same principles apply for network nodes receiving unknown, unforeseen and erroneous RRC information containers, although the notification of the error should be done in a different manner, as specified in the following:

The network node receiving an invalid RRC information container from another network node should:

- if the received RRC information container was unknown, unforeseen or erroneous:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO container, including the IE "Failure cause" set to "Protocol error" and the IE "Protocol error information" including an IE "Protocol error cause" which should be set as follows:
    - to "ASN.1 violation or encoding error" upon receiving an RRC information container for which the encoded message does not result in any valid abstract syntax value;
    - to "Message type non-existent or not implemented" upon receiving an unknown RRC information container type;
    - to "Message extension not comprehended" upon receiving an RRC information container including an undefined critical message extension;
    - to "Information element value not comprehended" upon receiving an RRC information container including an mandatory IE for which no default value is defined and for which either the value is set to spare or for which the encoded IE does not result in a valid transfer syntax. The same applies for conditional IEs, for which the conditions for presence are met, the IE is present but has a value set to spare or for which the encoded IE does not result in a valid transfer syntax;
    - to "~~Conditional i~~Information element missing ~~error~~" upon receiving an RRC information container with an absent conditional IE for which the conditions for presence are met;
- if there was another failure to perform the operation requested by the received RRC information container:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO container, including the IE "Failure cause" set to a value that reflects the failure cause;
- send the RRC INFORMATION CONTAINER FAILURE INFO container to the network node from which the invalid RRC protocol information was received.

NOTE: The RRC information container may be transferred across the network interfaces by means of a transparent container, if available.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26-30 November 2001

Tdoc R2-012728

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1184** ⌘ **rev** **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction of Traffic Volume Measurement reporting criteria
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	26-11-2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The IE " Parameters sent for each transport channel" included in "Traffic Volume Measurement reporting criteria" is Optional. However it seems that no scenario exists where this IE would not be included. Therefore, it is proposed to change its "need" to Mandatory.
Summary of change:	⌘	Clarification added that the IE " Parameters sent for each transport channel" shall always be included. The correction proposed is done according to the guidelines in 25.921 for the case when an IE is specified erroneously as OP in ASN.1 but it should be MP. If this IE is absent then the UE shall consider it as a protocol error. The cause of the protocol error for this case is "Information Element missing". This CR changes the naming of the protocol error "Conditional information error eror" to "Information Element missing" in order to cover also the case of corrections as proposed in this CR.
Consequences if not approved:	⌘	Traffic Volume Measurement Reporting specification is ambigous

Clauses affected:	⌘	8.6.7.11, 9.5, 10.3.3.26, 10.3.7.72, 11.3, 14.12.0a		
Other specs affected:	⌘	☒ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1183r1
Other comments:	⌘			

How to create CRs using this form:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.6.7.11 Traffic Volume Measurement Reporting Criteria

If the IE "Traffic Volume Measurement Reporting Criteria" is received by the UE, the UE shall:

- if the IE "Parameters sent for each transport channel" is absent:
  - set the variable PROTOCOL_ERROR_REJECT to TRUE;
  - set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "Information element missing";
- store the content of the IE "Traffic Volume Measurement Reporting Criteria" to the variable MEASUREMENT_IDENTITY.

If the IE "UL transport channel id" is not included, the UE shall:

- apply the measurement reporting criteria to all uplink transport channels indicated in the IE "Traffic volume measurement object";
- if the UTRAN has not specified a traffic volume measurement object for a given measurement identity:
  - apply the measurement reporting criteria to all uplink transport channels that are configured for the current UE state.

If the IE "Tx interruption after trigger" is included, the UE shall:

- block DTCH transmissions on the RACH during the time specified in the IE after a measurement report is transmitted.

9.5 Conditional information element error

If the UE receives an RRC message on the DCCH, BCCH, PCCH, or addressed to the UE on the CCCH or on the SHCCH, or sent to the UE in an RRC information container via a radio access technology other than UTRAN, for which the specified conditions for absence of a conditional IE are met and that IE is present, the UE shall:

- ignore the IE;
- treat the rest of the message as if the IE was not present.

If the UE receives an RRC message on the DCCH, or addressed to the UE on the CCCH or on the SHCCH, or sent to the UE via a radio access technology other than UTRAN, for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- set the variable PROTOCOL_ERROR_REJECT to TRUE;
- set the IE "Protocol error cause" in the variable PROTOCOL_ERROR_INFORMATION to "~~Conditional I~~information element missing~~error~~";
- perform procedure specific error handling according to clause 8.

If the UE receives a system information block on the BCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the system information block.

If the UE receives an RRC message on the BCCH or PCCH for which the specified conditions for presence of a conditional IE are met and that IE is absent, the UE shall:

- ignore the message.

10.3.3.26 Protocol error cause

This IE indicates the cause for a message or information that was not comprehended.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Protocol error cause	MP		Enumerated (ASN.1 violation or encoding error, Message type non-existent or not implemented, Message not compatible with receiver state, Information element value not comprehended, ~~Conditional li~~information element missing ~~error~~, Message extension not comprehended)	At least one spare value needed.

10.3.7.72 Traffic volume measurement reporting criteria

Contains the measurement reporting criteria information for a traffic volume measurement.

Event 4a: Transport Channel Traffic Volume [15] exceeds an absolute threshold.

Event 4b: Transport Channel Traffic Volume [15] becomes smaller than an absolute threshold.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Parameters sent for each transport channel	OP	1 to <maxTrCH>		This IE is always required, need is OP to align with ASN.1
>Uplink transport channel type	OP		Enumerated(DCH,RACHorCPCH,USCH)	USCH is TDD only. CPCH is FDD only. RACHorCPCH is the currently configured default in the uplink.
>UL Transport Channel ID	CV-*UL-DCH/USCH*		Transport channel identity 10.3.5.18	
>Parameters required for each Event	OP	1 to <maxMeasperEvent>		
>>Traffic volume event identity	MP		Traffic volume event identity 10.3.7.66	
>>Reporting Threshold	MP		Enumerated(8,16,32,64,128,256,512,1024,2K,3K,4K,6K,8K,12K,16K,24K,32K,48K,64K,96K,128K,192K,256K,384K,512K,768K)	Threshold in bytes And N Kbytes = N*1024 bytes
>>Time to trigger	OP		Time to trigger 10.3.7.64	Indicates the period of time between the timing of event detection and the timing of sending Measurement Report. Time in ms
>>Pending time after trigger	OP		Integer(250, 500, 1000, 2000, 4000, 8000, 16000)	Indicates the period of time during which it is forbidden to send any new measurement reports with the same Traffic volume event identity even if the triggering condition is fulfilled. Time in milliseconds
>>Tx interruption after trigger	OP		Integer (250, 500, 1000, 2000, 4000, 8000, 16000)	Time in milliseconds. Indicates how long the UE shall block DTCH transmissions on the RACH after a measurement report is triggered.

Condition	Explanation
UL-DCH/USCH	If IE "Uplink transport channel type" is equal to "DCH" or "USCH" (TDD only) this IE is optional. Otherwise the IE is not needed.

11.3 Information element definitions

```
...

-- ************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- ************************************************
...

ProtocolErrorCause ::=              ENUMERATED {
                                        asn1-ViolationOrEncodingError,
                                        messageTypeNonexistent,
                                        messageNotCompatibleWithReceiverState,
                                        ie-ValueNotComprehended,
                                        conditionalIinformationElementMissingError,
                                        messageExtensionNotComprehended,
                                        spare1, spare2 }



...

-- ************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- ************************************************

...


TrafficVolumeReportingCriteria ::= SEQUENCE {
    transChCriteriaList                 TransChCriteriaList                 OPTIONAL
--NOTE: IE "transChCriteriaList" should be mandatory in later versions of this message
}
```

14.12.0a General error handling for RRC information containers

The handling of RRC messages that are terminated in the UE and transferred using RRC information containers is covered by clauses 8 and 9 of this specification.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages, as specified in the following.

Although the same principles apply for network nodes receiving unknown, unforeseen and erroneous RRC information containers, although the notification of the error should be done in a different manner, as specified in the following:

The network node receiving an invalid RRC information container from another network node should:

- if the received RRC information container was unknown, unforeseen or erroneous:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO container, including the IE "Failure cause" set to "Protocol error" and the IE "Protocol error information" including an IE "Protocol error cause" which should be set as follows:
    - to "ASN.1 violation or encoding error" upon receiving an RRC information container for which the encoded message does not result in any valid abstract syntax value;
    - to "Message type non-existent or not implemented" upon receiving an unknown RRC information container type;
    - to "Message extension not comprehended" upon receiving an RRC information container including an undefined critical message extension;
    - to "Information element value not comprehended" upon receiving an RRC information container including an mandatory IE for which no default value is defined and for which either the value is set to spare or for which the encoded IE does not result in a valid transfer syntax. The same applies for conditional IEs, for which the conditions for presence are met, the IE is present but has a value set to spare or for which the encoded IE does not result in a valid transfer syntax;
    - to "~~Conditional i~~Information element missing ~~error~~" upon receiving an RRC information container with an absent conditional IE for which the conditions for presence are met;
- if there was another failure to perform the operation requested by the received RRC information container:
  - prepare an RRC INFORMATION CONTAINER FAILURE INFO container, including the IE "Failure cause" set to a value that reflects the failure cause;
- send the RRC INFORMATION CONTAINER FAILURE INFO container to the network node from which the invalid RRC protocol information was received.

NOTE: The RRC information container may be transferred across the network interfaces by means of a transparent container, if available.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26-30 November 2001

Tdoc R2-012755

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1185** ⌘ **rev** **r3** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction of UE Positioning
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	26-11-2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ UE Positioning specification is not complete for all RRC states

Summary of change: ⌘ The proposed changes are:

- in sections 8.1.1.6.15, 8.1.1.6.15.1, 8.1.1.6.15.2, 8.1.1.6.15.3 text was moved to 8.6.7.19.3 since this description applies for the GPS assistance data received in Sistem information or in Measurement Control or in Assistance Data Delivery meassages.

- in sections 8.1.1.6.15, 8.1.1.6.15.4 the handling of the ciphering info was moved to a new section 8.6.17.9.4

- in section 8.4.1.6, 8.4.1.7, 8.4.1.8 and 8.4.1.9 new description text was added to describe UE behavior when UP measurements are configured. This new text applies the principles proposed in Tdoc R2-012380 on handling of UP in RRC states

- in section 8.4.3 it is clarified that the Assistance Data Delivery procedure is initiated by UTRAn at the request from CN

- section 8.5.11 is updated to allow also to use the FACH measurement occasions for UP OTDOA when SFN-SFN type 2 on a different frequency is requested. The changes propose to keep the section 8.5.11 as a generic action and specify the case when the FACH measurement occasions shall be used in relevant sections in 8.4.1.6 and 8.4.1.9.

- section 8.6.7.1 is updated to include also the measurement validity for UP measurements

- section 8.6.7.19.1 is edited to be used as a pointer to new sections, e.g. 8.6.7.19.1a and 8.6.7.19.1b where it is specified who the UE will set the Measurement Report for UE assisted and UE-based methods

- sections 8.1.1.6.15.4, 8.6.7.19.2 and 2a, and tabular sections 10.2.48.8.18.4, 10.3.7.100, 10.3.7.103, 10.3.7.106, 10.3.7.108, and variable 13.4.28b are updated in order to allow the use of System information broadcast to be used for OTDOA

		UE-based assistance data which may be ciphered and also for OTDOA UE-assisted methods - new section 8.6.7.19.4 is added and variables 13.4.28a and 13.4.28c are updated in order to clarify the handling of deciphering keys. It is clarified also it is possible to have a couple of deciphering keys for each method, i.e. OTDOA or GPS. - new section 8.6.7.19.6 and tabular 10.3.7.90 are updated in order to introduce the information for the refernce cell to be used for UE GPS Timing of cell frames measurement. - section 8.6.7.20 clarifies that the measurement SFN-SFN type 2 should not be reported on RACH reporting - tabular 10.3.7.88, 10.3.7.96 is updated to allow alignement between 25.133 and RRC of the measurement UTRAN reporting of cell frames - tabular 10.3.7.93, 10.3.7.109 is updated allow alignement between 25.133 and RRC of the measurement UE reporting of cell frames - tabular 10.3.7.105 is updated to introduce the frequency info for neighboring cell reporting - tabular 10.3.7.108 is updated to remove the frequency info of the reference cell for OTDOA measurements since it is assumed to the same as the current frequency - tabular 10.3.7.111 is updated to introduce the vertical accuracy and rename the accuracy in horizontal accuracy. this is in line with RANAP. it is alos propose to remove the multiple sets from the tabular as decided in last RAN2#24 meeting. - section 14.7.3 description text added Corrections to Rev1 (highlighted in "green"): ASN.1 corrections are added according to the following principle. All ASN.1 corrections are done using the non-critical extension mechanism for OTDOA UE assisted method. The other corrections are done in a straight forward corrections. **-** added new SIB15.5 to broadcast Assistance data possibly ciphered for UE based OTDOA. SIB15.4 is left unciphered for UE-assisted OTDOA - corrected the granularity and the mapping of Node B Clock drift and SFN-SFN time drift and alignment with RAN3 - corrected the handling of the Week Number for the Almanac **Isolated analysis impact:** The corrected functionality is UE positioning measurement configuration and measurement reporting. • « Correction to a function where the specification was : o Procedural text or rules were missing. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. »
Consequences if not approved:	⌘	UE behavior for UE Positioning is unclear and unspecified

Clauses affected:	⌘	8.1.1.1.2, 8.1.1.6.15, 8.1.1.6.15.1, 8.1.1.6.15.2, 8.1.1.6.15.3, 8.1.1.6.15.4, 8.1.1.6.15.5 (new), 8.4.1.3, 8.4.1.6.7, 8.4.1.7.5 (new), 8.4.1.8.5 (new), 8.4.1.9.5

		(new), 8.4.1.9a.4 (new), 8.4.2.2, 8.4.3.2, 8.4.3.3, 8.5.11, 8.6.7.1, 8.6.7.18a (new), 8.6.7.19.0 (new) , 8.6.7.19.1, 8.6.7.19.1a (new) , 8.6.7.19.1b (new) , 8.6.7.19.2, 8.6.7.19.2a (new) , 8.6.7.19.3, 8.6.7.19.3.1, 8.6.7.19.3.2, 8.6.7.19.3.3, 8.6.7.19.3.3a (new) , 8.6.7.19.3.4, 8.6.7.19.3.5, 8.6.7.19.3.6, 8.6.7.19.3.7, 8.6.7.19.3.8, 8.6.7.19.4 (new) , 8.6.7.19.5 (new) , 8.6.7.19.6 (new), 8.6.7.21 (new), 10.2.4, 10.2.48.8.18.4, 10.2.48.8.18.4a (new), 10.3.3.45, 10.3.7.51, 10.3.7.86, 10.3.7.87, 10.3.7.88, 10.3.7.89, 10.3.7.90, 10.3.7.91, 10.3.7.93, 10.3.7.95a (new), 10.3.7.96, 10.3.7.99, 10.3.7.100, 10.3.7.101, 10.3.7.103, 10.3.7.103a (new) , 10.3.7.105, 10.3.7.106, 10.3.7.106a (new) , 10.3.7.108, 10.3.7.108a (new) , 10.3.7.109, 10.3.7.109a (new) , 10.3.7.111, 10.3.8.21, 10.3.8.22, 11.2, 11.3, 13.4.28a, 13.4.28b, 13.4.28c (new), 13.4.32, 14.7.3, 14.7.3.1, 14.7.3.2, 14.7.3.3		
Other specs affected:	⌘	X X 	Other core specifications Test specifications O&M Specifications	⌘	25.331 v4.2.1, CR 1186
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.1.1.2 System information blocks

Table 8.1.1 specifies all system information blocks and their characteristics.

The *area scope column* in table 8.1.1 specifies the area where a system information block's value tag is valid. If the area scope is *cell*, the UE shall consider the system information block to be valid only in the cell in which it was read. If system information blocks have been previously stored for this cell, the UE shall check whether the value tag for the system information block in the entered cell is different compared to the stored value tag. If the area scope is *PLMN*, the UE shall check the value tag for the system information block when a new cell is selected. If the value tag for the system information block in the new cell is different compared to the value tag for the system information block stored in the UE, the UE shall re-read the system information block.

For System information block types 15.2, 15.3 and 16, which may have multiple occurrences, each occurrence has its own independent value tag. The UE- shall re-read a particular occurrence if the value tag of this occurrence has changed compared to that stored in the UE.

The *UE mode/state column when block is valid* in Table 8.1.1 specifies in which UE mode or UE state the IEs in a system information block shall be regarded as valid by the UE. In other words, the indicated system information block becomes invalid upon change to a mode/state that is not included in this column. In some cases, the states are inserted in brackets to indicate that the validity is dependent on the broadcast of the associated System Information Blocks by the network as explained in the relevant procedure section.

The *UE mode/state column when block is read* in Table 8.1.1 specifies in which UE mode or UE state the IEs in a system information block may be read by the UE. The UE shall have the necessary information prior to execution of any procedure requiring information to be obtained from the appropriate system information block. The requirements on the UE in terms of when to read the system information may therefore be derived from the procedure specifications that specify which IEs are required in the different UE modes/states in conjunction with the different performance requirements that are specified. System Information Block type 10 shall only be read by the UE while in CELL_DCH.

NOTE: There are a number of system information blocks that include the same IEs while the UE mode/state in which the information is valid differs. This approach is intended to allows the use of different IE values in different UE mode/states.

The *Scheduling information* column in Table 8.1.1 specifies the position and repetition period for the SIB.

The *modification of system information* column in Table 8.1.1 specifies the update mechanisms applicable for a certain system information block. For system information blocks with a value tag, the UE shall update the information according to subclause 8.1.1.7.1 or 8.1.1.7.2. For system information blocks with an expiration timer, the UE shall, when the timer expires, perform an update of the information according to subclause 8.1.1.7.4.

Table 8.1.1: Specification of system information block characteristics

System information block	Area scope	UE mode/state when block is valid	UE mode/state when block is read	Scheduling information	Modification of system information	Additional comment
Master information block	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	SIB_POS = 0 SIB_REP = 8 (FDD) SIB_REP = 8, 16, 32 (TDD) SIB_OFF=2	Value tag	
Scheduling block 1	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information" in MIB	Value tag	
Scheduling block 2	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information" in MIB	Value tag	
System information block type 1	PLMN	Idle mode CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 2	Cell	URA_PCH	URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 3	Cell	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH)	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH)	Specified by the IE "Scheduling information"	Value tag	
System information block type 4	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	If System information block type 4 is not broadcast in a cell, the connected mode UE shall apply information in System information block type 3 in connected mode.
System information block type 5	Cell	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only))	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only))	Specified by the IE "Scheduling information"	Value tag	

System information block type 6	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Specified by the IE "Scheduling information"	Value tag	If system information block type 6 is not broadcast in a cell, the connected mode UE shall read System information block type 5. If some of the optional IEs are not included in System information block type 6, the UE shall read the corresponding IEs in System information block type 5 In TDD mode system information block 6 shall only be read in CELL_DCH if required for open loop power control as specified in subclause 8.5.7 and/or if shared transport channels are assigned to the UE. If in these cases system information block type 6 is not broadcast the UE shall read system information block type 5.
System information block type 7	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Specified by the IE "Scheduling information"	Expiration timer = MAX(320 ms,SIB_REP * ExpirationTimeFactor)	In TDD mode system information block type 7 shall only be read in CELL_DCH if shared transport channels are assigned to the UE.
System information block type 8	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 9	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	
System information block type 10	Cell	CELL_DCH	CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	
System information block type 11	Cell	Idle mode (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH)	Idle mode (CELL_FACH, CELL_PCH, URA_PCH)	Specified by the IE "Scheduling information"	Value tag	

System information block type 12	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	If system information block type 12 is not broadcast in a cell, the connected mode UE shall read System information block type 11. If some of the optional IEs are not included in System information block type 12, the UE shall read the corresponding IEs in System information block type 11.
System information block type 13	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.1	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.2	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.3	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.4	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 14	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = MAX([320 ms], SIB_REP * ExpirationTimeFactor)	This system information block is used in TDD mode only. System information block type 14 shall only be read in CELL_DCH if required for open loop power control as specified in subclause 8.5.7.
System information block type 15	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 15.1	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 15.2	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 15.3	PLMN	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 15.4	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	

System information block type 15.5	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 16	PLMN	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 17	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	This system information block is used in TDD mode only. System information block type 17 shall only be read if shared transport channels are assigned to the UE.
System Information Block type 18	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	

The UE shall acquire all system information blocks except system information block type 10 on BCH. System Information Block type 10 shall be acquired on the FACH and only by UEs with support for simultaneous reception of one SCCPCH and one DPCH. If System Information Block type 10 is not broadcast in a cell, the DRAC procedures do not apply in this cell. System Information Block type 10 is used in FDD mode only.

8.1.1.6.15 System Information Block type 15

If the UE is in idle or connected mode, and supports GPS location services ~~and/or OTDOA location services~~ it should store all relevant IEs included in this system information block. The UE shall:

- if the IE "GPS Data ciphering info" is included:~~, and the UE has a full or reduced complexity GPS receiver functionality (the UE will know that the broadcast GPS data is ciphered in accordance with the Data Assistance Ciphering Algorithm detailed in [18]):~~

  - act as specified in the subclause 8.6.7.19.4;

  ~~- store the parameters contained within this IE (see 10.3.7.86 for details) in the IE "GPS Data ciphering info" in variable UE_POSITIONING_GPS_DATA; and~~

  ~~- use them to decipher the broadcast UE positioning GPS information contained within the System Information Block types 15.1, 15.2 and 15.3;~~

- ~~store~~act upon the received IE "Reference position" as specified in subclause 8.6.7.19.3.8;~~in the IE "UE positioning GPS reference UE position" in variable UE_POSITIONING_GPS_DATA and use it as a priori knowledge of the approximate location of the UE~~;

- act upon the received ~~store the~~ IE "GPS reference time" as specified in subclause 8.6.7.19.3.7~~in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and use it as a reference GPS time~~;

~~- use "GPS TOW msec" as GPS Time of Week in milliseconds;~~

~~- if the IE "GPS TOW rem usec" is included in the IE "GPS reference time":~~

~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as GPS Time of Week in microseconds;~~

~~- if the IE "NODE B Clock Drift" is included in the IE "GPS reference time":~~

~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as an estimate of the drift rate of the NODE B clock relative to GPS time;~~

~~- if the IE "NODE B Clock Drift" is not included in the IE "GPS reference time":~~

~~- assume the value 0;~~

~~- if SFN is included in the IE "GPS reference time" and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not included:~~

~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as the relationship between GPS time and air interface timing of the NODE B transmission in the serving cell;~~

~~- if SFN is included in IE "GPS reference time" and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:~~

~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as the relationship between GPS time and air-interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";~~

- if IE "Satellite information" is included:

  - act upon this list of bad satellites as specified in subclause 8.6.7.19.3.6.

NOTE: For efficiency purposes, the UTRAN should broadcast System Information Block type 15 if it is broadcasting System Information Block type 15.2.

8.1.1.6.15.1 System Information Block type 15.1

The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

~~- use "Status/Health" in the IE "DGPS Corrections" to determine the status of the differential corrections;~~

- act on "DGPS information" in the IE "DGPS Corrections" in a similar manner as specified in [13] except that the scale factors for PRC and RRC are different. In addition, the IE group DGPS information also includes Delta PRC2 and Delta RRC2. Delta PRC2 is the difference in the pseudorange correction between the satellite's ephemeris identified by IODE and the previous ephemeris two issues ago IODE –2. Delta RRC2 is the difference in the pseudorange rate-of-change correction between the satellite's ephemeris identified by IODE and IODE-2. These two additional IEs can extend the life of the raw ephemeris data up to 6 hours. If the IEs "Delta PRC3" and "Delta RRC3" are included, UE may use them as appropriate e.g. to extend the life of the raw ephemeris data up to 8 hours;

- act upon the received IE "UE Positioning GPS DGPS corrections" as specified in subclause 8.6.7.19.3.3.

8.1.1.6.15.2 System Information Block type 15.2

For System Information Block type 15.2 multiple occurrences may be used; one occurrence for one satellite. To identify the different occurrences, the scheduling information for System Information Block type 15.2 includes IE "SIB occurrence identity and value tag". The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

- compare for each occurrence the value tag of the stored occurrence, if any, with the occurrence value tag included in the IE "SIB occurrence identity and value tag" for the occurrence of the SIB with the same occurrence identity;

- in case the UE has no SIB occurrence stored with the same identity or in case the occurrence value tag is different:

  - store the occurrence information together with its identity and value tag for later use;

- in case an occurrence with the same identity but different value tag was stored:

  - overwrite this one with the new occurrence read via system information for later use;

- interpret IE "Transmission TOW" as a very coarse estimate of the current time, i.e., the approximate GPS time-of-week when the message is broadcast;

- interpret IE "SatID" as the satellite ID of the data from which this message was obtained;
- act upon the received IEs "Sat ID" and "GPS Ephemeris and Clock Corrections Parameter" as specified in subclause 8.6.7.19.3.4;
- ~~act on the rest of the IEs in a manner similar to that specified in [12]. In addition, the UE can utilise these IEs for GPS time dissemination and sensitivity improvement.~~

The IE "Transmission TOW" may be different each time a particular SIB occurrence is transmitted. The UTRAN should not increment the value tag of the SIB occurrence if the IE "Transmission TOW" is the only IE that is changed.

The UE may not need to receive all occurrences before it can use the information from any one occurrence.

8.1.1.6.15.3 System Information Block type 15.3

For System Information Block type 15.3 multiple occurrences may be used; one occurrence for each set of satellite data. To identify the different occurrences, the scheduling information for System Information Block type 15.3 includes IE "SIB occurrence identity and value tag". The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

- compare for each occurrence the value tag of the stored occurrence, if any, with the occurrence value tag included in the IE "SIB occurrence identity and value tag" for the occurrence of the SIB with the same occurrence identity;
- in case the UE has no SIB occurrence stored with the same identity or in case the occurrence value tag is different:
  - store the occurrence information together with its identity and value tag for later use;
- in case an occurrence with the same identity but different value tag was stored:
  - overwrite this one with the new occurrence read via system information for later use;
- interpret IE "Transmission TOW" as a very coarse estimate of the current time, i.e., the approximate GPS time-of-week when the message is broadcast;
- ~~interpret IE "SatMask" as the satellites that contain the pages being broadcast in this message;~~
- ~~interpret IE "LSB TOW" as the least significant 8 bits of the TOW ([12]);~~
- ~~interpret "Data ID" in the IE "UE positioning GPS almanac" as the Data ID field contained in the indicated subframe, word 3, most significant 2 bits, as defined by [12];~~
- if the IE "GPS Almanac and Satellite Health" is included:
  - interpret IE "SatMask" as the satellites that contain the pages being broadcast in this message;
  - interpret IE "LSB TOW" as the least significant 8 bits of the TOW ([12]);
  - act upon the received IE “GPS Almanac and Satellite Health” as specified in subclause 8.6.7.19.3.2;
- if the IE "GPS ionospheric model" is included:
  - act upon the received IE “GPS ionospheric model” as specified in subclause 8.6.7.19.3.5;
- if the IE "GPS UTC model" is included:
  - act upon the received IE “GPS UTC model” as specified in subclause 8.6.7.19.3.9;
- ~~act on the rest of the IEs in a similar manner as specified in [12]. In addition, the UE can utilise these IEs including non-information bits for GPS time dissemination and sensitivity improvement.~~

The IE "Transmission TOW" may be different each time a particular SIB occurrence is transmitted. The UTRAN should not increment the value tag of the SIB occurrence if the IE "Transmission TOW" is the only IE that is changed. One SIB occurrence value tag is assigned to the table of subclause 10.2.48.8.18.3.

The UE may not need to receive all occurrences before it can use the information for any one occurrence.

8.1.1.6.15.4 System Information Block type 15.4

~~If the UE is in idle or connected mode, and~~

- ~~if IE "OTDOA ciphering info" is included and supports the UE supports UE-based OTDOA UE positioning method the UE shall:~~
  - ~~act as specified in subclause 8.6.7.19.3.2;~~
  - ~~store IE "OTDOA ciphering info" in OTDOA Data ciphering info in variable UE_POSITIONING_OTDOA_DATA if it is included.~~
- ~~if IE "OTDOA ciphering info" is included and the UE does not support UE-based OTDOA positioning the UE shall:~~
  - ~~ignore System Information Block 15.4 and act as if no assistance data is broadcast~~
- ~~if IE "OTDOA ciphering info" is not included, the UE shall~~
  - ~~act as specified in subclause 8.6.7.19.2;~~

If the UE is in idle mode or connected mode, the UE shall:

- if the IE "OTDOA ciphering info" is included:
  - act as specified in subclause 8.6.7.19.4;

If the UE is in connected mode, the UE shall:

- act as specified in subclause 8.6.7.19.2.

8.1.1.6.15.5 System Information Block type 15.5

If the UE is in idle or connected mode, the UE shall:

- if the UE supports UE-based OTDOA positioning:
  - act as specified in subclause 8.6.7.19.2a;

~~If the UE is in idle or connected mode, the UE shall:~~

- ~~if the UE supports UE-based OTDOA positioning:~~
  - ~~if the IE "OTDOA assistance data for UE-based" is included:~~
    - ~~if the IE "OTDOA ciphering info" is included:~~
      - ~~act as specified in subclause 8.6.7.19.4;~~
    - ~~act as specified in subclause 8.6.7.19.2a;~~

~~If the UE is in connected mode, the UE shall:~~

- ~~if the UE does not support UE-based OTDOA positioning; or~~
- ~~if the UE does support UE-based OTDOA positioning but the IE "OTDOA assistance data for UE-based" is not included:~~
  - ~~if the IE " OTDOA assistance data for UE-assisted" is included:~~
    - ~~ignore this IE;~~
  - ~~act as specified in subclause 8.6.7.19.2.~~
  - ~~if the IE "OTDOA ciphering info" is not included:~~
    - ~~;~~

8.4 Measurement procedures

8.4.0 Measurement related definitions

UTRAN may control a measurement in the UE either by broadcast of SYSTEM INFORMATION and/or by transmitting a MEASUREMENT CONTROL message.

The following information is used to control the UE measurements and the measurement results reporting:

1. **Measurement identity**: A reference number that should be used by the UTRAN when setting up, modifying or releasing the measurement and by the UE in the measurement report.
2. **Measurement command**: One out of three different measurement commands.
   - Setup: Setup a new measurement.
   - Modify: Modify a previously defined measurement, e.g. to change the reporting criteria.
   - Release: Stop a measurement and clear all information in the UE that are related to that measurement.
3. **Measurement type**: One of the types listed below describing what the UE shall measure.

Presence or absence of the following control information depends on the measurement type

4. **Measurement objects:** The objects on which the UE shall measure measurement quantities, and corresponding object information.
5. **Measurement quantity:** The quantity the UE shall measure on the measurement object. This also includes the filtering of the measurements.
6. **Reporting quantities:** The quantities the UE shall include in the report in addition to the quantities that are mandatory to report for the specific event.
7. **Measurement reporting criteria**: The triggering of the measurement report, e.g. periodical or event-triggered reporting.
8. **Measurement Validity**: Defines in which UE states the measurement is valid.
9. **Measurement reporting mode**: This specifies whether the UE shall transmit the measurement report using AM or UM RLC.
10. **Additional measurement identities**: A list of references to other measurements. When this measurement triggers a measurement report, the UE shall also include the reporting quantities for the measurements referenced by the additional measurement identities.

All these measurement parameters depend on the measurement type and are described in more detail in clause 14.

The different types of measurements are:

- **Intra-frequency measurements**: measurements on downlink physical channels at the same frequency as the active set. A measurement object corresponds to one cell. Detailed description is found in subclause 14.1.
- **Inter-frequency measurements**: measurements on downlink physical channels at frequencies that differ from the frequency of the active set. A measurement object corresponds to one cell. Detailed description is found in subclause 14.2.
- **Inter-RAT measurements**: measurements on downlink physical channels belonging to another radio access technology than UTRAN, e.g. GSM. A measurement object corresponds to one cell. Detailed description is found in subclause 14.3.
- **Traffic volume measurements**: measurements on uplink traffic volume. A measurement object corresponds to one cell. Detailed description is found in subclause 14.4.

- **Quality measurements**: Measurements of downlink quality parameters, e.g. downlink transport block error rate. A measurement object corresponds to one transport channel in case of BLER. A measurement object corresponds to one timeslot in case of SIR (TDD only). Detailed description is found in subclause 14.5.

- **UE-internal measurements**: Measurements of UE transmission power and UE received signal level. Detailed description is found in subclause 14.6.

- **UE positioning measurements:** Measurements of UE position. Detailed description is found in subclause 14.7.

The UE shall support a number of measurements running in parallel as specified in [19] and [20]. The UE shall also support that each measurement is controlled and reported independently of every other measurement.

Cells that the UE is monitoring are grouped in the UE into three different categories:

1. Cells, which belong to the **active set.** User information is sent from all these cells. In FDD, the cells in the active set are involved in soft handover. In TDD the active set always comprises one cell only.

2. Cells, which are not included in the active set, but are monitored according to a neighbour list assigned by the UTRAN belong to the **monitored set.**

3. Cells detected by the UE, which are neither included in the active set nor in the monitored set belong to the **detected set.** Reporting of measurements of the detected set is only applicable to intra-frequency measurements made by UEs in CELL_DCH state.

8.4.1 Measurement control

Figure 56: Measurement Control, normal case

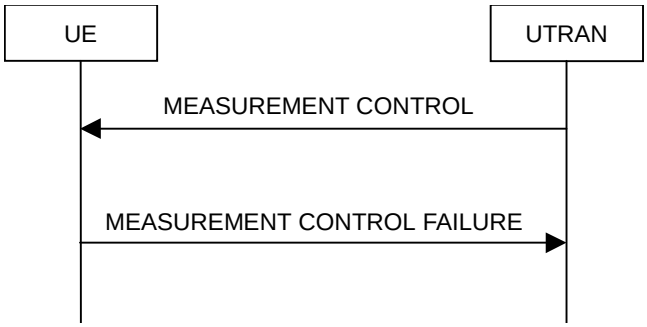

Figure 57: Measurement Control, failure case

8.4.1.1 General

The purpose of the measurement control procedure is to setup, modify or release a measurement in the UE.

8.4.1.2 Initiation

The UTRAN may request a measurement by the UE to be setup, modified or released with a MEASUREMENT CONTROL message, which is transmitted on the downlink DCCH using AM RLC.

The UTRAN should take the UE capabilities into account when a measurement is requested from the UE.

When a new measurement is created, UTRAN should set the IE "Measurement identity" to a value, which is not used for other measurements. UTRAN may use several "Measurement identity" for the same "Measurement type". In case of

setting several "Measurement identity" within a same "Measurement type", the measurement object or the list of measurement objects can be set differently for each measurement with different "Measurement identity ".

When a current measurement is modified or released, UTRAN should set the IE "Measurement identity" to the value, which is used for the measurement being modified or released. In case of modifying IEs within a "Measurement identity", it is not needed for UTRAN to indicate the IEs other than modified IEs, and the UE continues to use the current values of the IEs that are not modified.

8.4.1.3 Reception of MEASUREMENT CONTROL by the UE

Upon reception of a MEASUREMENT CONTROL message the UE shall perform actions specified in subclause 8.6 unless otherwise specified below.

The UE shall:

- read the IE "Measurement command";
- if the IE "Measurement command" has the value "setup":
  - store this measurement in the variable MEASUREMENT_IDENTITY according to the IE "measurement identity", possibly overwriting the measurement previously stored with that identity;
  - for measurement types "inter-RAT measurement" or "inter-frequency measurement":
    - if, according to its measurement capabilities, the UE requires compressed mode to perform the measurements and a compressed mode pattern sequence with an appropriate measurement purpose is simultaneously activated by the IE "DPCH compressed mode status info"; or
    - if, according to its measurement capabilities, the UE does not require compressed mode to perform the measurements:
      - if the measurement is valid in the current RRC state of the UE:
        - begin measurements according to the stored control information for this measurement identity;

- for measurement type "UE positioning measurement":
  - if the UE is in CELL_FACH state:
    - if IE "Positioning Method" is set to "OTDOA":
      - if IE "Method Type" is set to "UE assisted":
        - if IE "UE positioning OTDOA assistance data for UE assisted" is not included:
          - if System Information Block 15.4 is broadcast:
            - read System Information Block 15.4;
          - act as specified in section 8.6.7.19.2;
      - if IE "Method Type" is set to "UE based":
        - if IE "UE positioning OTDOA assistance data for UE based" is not included:
          - if System Information Block 15.5 is broadcast:
            - read System Information Block 15.5;
          - act as specified in section 8.6.7.19.2a;

~~- for measurement type "UE positioning measurement":~~
  ~~- if the IE "Positioning method" is set to "GPS" and UE has neither received nor stored sufficient assistance data in variable UE_POSITIONING_GPS_DATA to perform the requested measurements:~~

~~- send a MEASUREMENT REPORT message to UTRAN, indicating the kind of assistance data which is necessary to fulfil the measurement request in the IE "UE positioning error";~~

- for any other measurement type:
  - if the measurement is valid in the current RRC state of the UE:
    - begin measurements according to the stored control information for this measurement identity.

- if the IE "Measurement command" has the value "modify":
  - for all measurement control present in the MEASUREMENT CONTROL message:
    - if a measurement was stored in the variable MEASUREMENT_IDENTITY associated to the identity by the IE "measurement identity":
      - replace the corresponding information stored in variable MEASUREMENT_IDENTITY associated to the identity indicated by the IE "measurement identity";
      - resume the measurements according to the new stored measurement control information.
    - otherwise:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if the IE "measurement command" has the value "release":
  - terminate the measurement associated with the identity given in the IE "measurement identity";
  - clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY.
- if the IE "DPCH Compressed Mode Status Info" is present,:
  - and if, as the result of this message, UE will have more than one transmission gap pattern sequence with the same measurement purpose active (according to IE 'TGMP' in variable TGPS_IDENTITY):
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
  - if pattern sequence corresponding to IE "TGPSI" is already active (according to "TGPS Status Flag"):
    - deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message;
  - after the time indicated by IE "TGPS reconfiguration CFN" has elapsed:
    - activate the pattern sequence stored in the variable TGPS_IDENTITY corresponding to each IE "TGPSI" for which the "TGPS status flag" is set to "active" at the time indicated by IE "TGCFN"; and
    - begin the inter-frequency and/or inter-RAT measurements corresponding to the pattern sequence measurement purpose of each activated pattern sequence;
    - if the values of IE "TGPS reconfiguration CFN" and IE "TGCFN" are equal:
      - start the concerned pattern sequence immediately at that CFN;
  - not alter pattern sequences stored in variable TGPS_IDENTITY, but not identitifed in IE "TGPSI"
- if the UE in CELL_FACH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in the variable MEASUREMENT_IDENTITY:
  - update the stored information with the traffic volume measurement control information in variable MEASUREMENT_IDENTITY; and
  - refrain from updating the traffic volume measurement control information associated with this measurement identity received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) until this measurement is explicitly released with another MEASUREMENT CONTROL message;

-- if the IE "Read SFN indicator" included in the IE "Cell info" of an inter-frequency cell is set to TRUE and the variable UE_CAPABILITY_TRANSFERRED has the DL "Measurement capability" for "FDD measurements" set to TRUE (the UE requires DL compressed mode in order to perform measurements on FDD):

  - set the variable CONFIGURATION_INCOMPLETE to TRUE;

- clear the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS;

The UE may:

- if the IE "Measurement command" has the value "setup":
  - for measurement type “UE positioning measurement”:
    - if the UE is CELL_FACH state:
      - if IE “Positioning Method” is set to “GPS”:
        - if IE “UE positioning GPS assistance data” is not included and variable UE_POSITIONING_GPS_DATA is empty:
          - if System Information Block 15, 15.1, 15.2 and 15.3 are broadcast:
            - read System Information Block 15, 15.1, 15.2 and 15.3;
          - act as specified in section 8.6.7.19.3;

- and the procedure ends.

8.4.1.4 Unsupported measurement in the UE

If UTRAN instructs the UE to perform a measurement that is not supported by the UE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.
- set the cause value in IE "failure cause" to "unsupported measurement";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

8.4.1.4a Configuration Incomplete

If the variable CONFIGURATION_INCOMPLETE is set to TRUE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS and clear that entry;
- clear the variable CONFIGURATION_INCOMPLETE;

- set the cause value in IE "failure cause" to "Configuration incomplete";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

~~8.4.1.4b Configuration Invalid~~

~~If the variable CONFIGURATION_INVALID_CONFIGURATION is set to TRUE, the UE shall:~~

- ~~retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;~~
- ~~set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS and clear that entry;~~
- ~~clear the variable CONFIGURATION_INVALID_CONFIGURATION;~~
- ~~set the cause value in IE "failure cause" to "invalid configuration";~~
- ~~submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;~~
- ~~continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;~~
- ~~and the procedure ends.~~

8.4.1.5 Invalid MEASUREMENT CONTROL message

If the MEASUREMENT CONTROL message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry.
- set the IE "failure cause" to the cause value "protocol error";
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

8.4.1.6 Measurements after transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state:

8.4.1.6.1 Intra-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop intra-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type intra-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" IEs from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):
  - use this information for reporting measured results in RACH messages.

8.4.1.6.2 Inter-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/ CELL_PCH/URA_PCH state, the UE shall:

- stop the inter-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type inter-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- in CELL_FACH state:
  - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.6.3 Inter-RAT measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop the inter-RAT type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or

- if the transition is not due to a reconfiguration message:
  - delete the measurements of type inter-RAT associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- in CELL_FACH state:
  - perform measurements on other systems according to the IE "FACH measurement occasion info".

8.4.1.6.4 Quality measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop quality type measurement reporting;
- delete all measurement control information of measurement type "quality" stored in the variable MEASUREMENT_IDENTITY.

8.4.1.6.5 UE internal measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop UE internal measurement type measurement reporting;
- delete all measurement control information of measurement type "UE internal" stored in the variable MEASUREMENT_IDENTITY.

8.4.1.6.6 Traffic volume measurement

Upon transition from CELL_DCH to CELL_FACH or CELL_PCH or URA_PCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "traffic volume" stored in the variable MEASUREMENT_IDENTITY; and
  - if the optional IE "measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "CELL_DCH":
    - stop measurement reporting;
    - store the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_DCH state;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
    - continue measurement reporting;
  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - resume this measurement and associated reporting;
- if no traffic volume type measurements valid in CELL_FACH or CELL_PCH or URA_PCH states are stored in the variable MEASUREMENT_IDENTITY:
  - store the measurement control information from the IE "Traffic volume measurement system information" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) in the variable MEASUREMENT_IDENTITY;
  - begin traffic volume measurement reporting according to the assigned information.

8.4.1.6.7 UE positioning measurement

Upon transition from CELL_DCH to CELL_FACH or CELL_PCH or URA_PCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "UE positioning" stored in the variable MEASUREMENT_IDENTITY; and
  - if the optional IE "measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "CELL_DCH":
    - stop measurement reporting;
    - store the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_DCH state;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
    - continue measurement reporting;
  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - resume this measurement and associated reporting;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the assistance data included in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, UE_POSITIONING_OTDOA_DATA_UE_ASSISTED and UE_POSITIONING_GPS_DATA;
- if the IE "Positioning Methods" stored in the variable MEASUREMENT_IDENTITY is set to "OTDOA" or "OTDOA or GPS":
  - if the IE "Method type" stored in the variable MEASUREMENT_IDENTITY is set to "UE-based" or "UE assisted preferred but UE based allowed" or "UE based preferred but UE assisted allowed":
    - begin monitoring assistance data received in System Information Block type 15.4 and System Information Block type 15.5 according to subclause 8.1.1.6.15;
  - if the IE "Method type" stored in the variable MEASUREMENT_IDENTITY is set to "UE-assisted":
    - begin monitoring assistance data received in System Information Block type 15.4 according to subclause 8.1.1.6.15;
- if the UE is in CELL_FACH state:
  - if the IE "UE positioning OTDOA neighbour cell list for UE assisted" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED or UE_POSITIONING_OTDOA_DATA_UE_BASED contains neighbour cells on other frequencies than the current frequency:
    - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

The UE may:

- if the IE "Positioning Methods" stored in the variable MEASUREMENT_IDENTITY is set to "GPS" or "OTDOA or GPS":

- begin monitoring assistance data received in System Information Block type 15 and/or System Information Block type 15.1 and/or System Information Block type 15.2 and/or System Information Block type 15.3 according to subclause 8.1.1.6.15;

- ~~begin monitoring assistance data received in System Information Block type 15 or System Information Block~~

8.4.1.6a Actions in CELL_FACH/CELL_PCH/URA/PCH state upon cell re-selection

Upon cell reselection while in CELL_FACH/CELL_PCH/URA/PCH state and the cell reselection has occurred after the measurement control information was stored, the UE shall:

- delete the all measurements of type intra-frequency, inter-frequency, and inter-RAT associated with the variable MEASUREMENT_IDENTITY

8.4.1.7 Measurements after transition from CELL_FACH to CELL_DCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_FACH to CELL_DCH state:

8.4.1.7.1 Intra-frequency measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "intra-frequency" stored in the variable MEASUREMENT_IDENTITY;
- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH:
  - resume the measurement reporting;
- if no intra-frequency measurements applicable to CELL_DCH state are stored in the variable MEASUREMENT_IDENTITY:
  - continue monitoring the list of neighbouring cells assigned in the IE "intra-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
  - if the IE "intra-frequency measurement reporting criteria" was included in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):
    - send the MEASUREMENT REPORT message when reporting criteria in IE "Reporting information for CELL_DCH" are fulfilled;

8.4.1.7.2 Inter-frequency measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- retrieve each set of measurement control information of measurement type "inter-frequency" stored in the variable MEASUREMENT_IDENTITY; and
- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH":
  - resume the measurement reporting.

8.4.1.7.3 Inter-RAT measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-RAT cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- retrieve each set of measurement control information of measurement type "inter-RAT" stored in the variable MEASUREMENT_IDENTITY; and
- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH":
  - resume the measurement reporting.

8.4.1.7.4 Traffic volume measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "traffic volume" stored in the variable MEASUREMENT_IDENTITY;
  - if the optional IE "measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - stop measurement reporting; and
    - save the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_FACH/CELL_PCH/URA_PCH state;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
    - continue measurement reporting;
  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "CELL_DCH":
    - resume this measurement and associated reporting;
- if no traffic volume type measurement has been assigned to the UE with a MEASUREMENT CONTROL message when transiting to CELL_DCH state:
  - continue an ongoing traffic volume type measurement, assigned in System Information Block type 11 (or System Information Block type 12, according to subclause 8.1.1.6.11);
- if the UE in CELL_DCH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in variable MEASUREMENT_IDENTITY:
  - update the stored information with the traffic volume measurement control information in variable MEASUREMENT_IDENTITY.

8.4.1.7.5 UE positioning measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "UE positioning" stored in the variable MEASUREMENT_IDENTITY; and
  - if the optional IE "Measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - stop measurement reporting; and
    - save the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_FACH/CELL_PCH/URA_PCH state;

- if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
  - continue measurement reporting;
- if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "CELL_DCH":
  - resume this measurement and associated reporting;

- stop monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block 15.54.

8.4.1.8 Measurements after transition from idle mode to CELL_DCH state

The UE shall obey the following rules for different measurement types after transiting from idle mode to CELL_DCH state:

8.4.1.8.1 Intra-frequency measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- begin or continue monitoring the list of cells assigned in the IE "intra-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- if the "intra-frequency measurement reporting criteria" IE was included in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):
  - begin measurement reporting according to the IE.

8.4.1.8.2 Inter-frequency measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11).

8.4.1.8.3 Inter-RAT measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-RAT cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11).

8.4.1.8.4 Traffic volume measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- begin a traffic volume type measurement, assigned in System Information Block type 11 (or System Information Block type 12, according to subclause 8.1.1.6.11).

8.4.1.8.5 UE positioning measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5;

8.4.1.9 Measurements after transition from idle mode to CELL_FACH state

The UE shall obey the follow rules for different measurement types after transiting from idle mode to CELL_FACH state:

8.4.1.9.1 Intra-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and IE "Maximum number of Reported cells on RACH" from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):
  - use this information for reporting measured results in RACH messages.

8.4.1.9.2 Inter-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.9.3 Inter-RAT measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- perform measurements on other systems according to the IE "FACH measurement occasion info".

8.4.1.9.4 Traffic volume measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- store the measurement control information from the IE "Traffic volume measurements system information" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) in the variable MEASUREMENT_IDENTITY;
- begin traffic volume measurement reporting according to the assigned information.

8.4.1.9.5 UE positioning measurement

Upon transition from idle mode to CELL_FACH state, the UE may:

- begin or continue monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5 according to subclause 8.1.1.6.15;
- if the IE "UE positioning OTDOA neighbour cell list for UE assisted" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED or
- if the IE "UE positioning OTDOA neighbour cell list for UE based" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED contains neighbour cells on other frequencies than the current frequency:
  - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.9a Measurements after transition from connected mode to idle mode

Upon transition from connected mode to idle mode the UE shall:

- stop measurement reporting for all measurements stored in the variable MEASUREMENT_IDENTITY;
- clear the variable MEASUREMENT_IDENTITY;
- apply the following rules for different measurement types.

8.4.1.9a.1 Intra-frequency measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring intra-frequency cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to subclause 8.1.1.6.11);
- begin monitoring intra-frequency cells listed in the IE "intra-frequency cell info list" received in System Information Block type 11.

8.4.1.9a.2 Inter-frequency measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring inter-frequency cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to subclause 8.1.1.6.11);
- begin monitoring inter-frequency cells listed in the IE "inter-frequency cell info list" received in System Information Block type 11.

8.4.1.9a.3 Inter-RAT measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring inter-RAT cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to 8.1.1.6.11);
- begin monitoring inter-RAT cells listed in the IE "inter-RAT cell info list" received in System Information Block type 11.

8.4.1.9a.4 UE positioning measurement

Upon transition from connected mode to idle mode, the UE may:

- begin or continue monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5;

8.4.1.10 Measurements when measurement object is no longer valid

8.4.1.10.1 Traffic volume measurement

If UE is no longer using the transport channel that is specified in the IE "Traffic volume measurement object", UE shall ignore any measurements that are assigned to that transport channel. If none of the transport channels that are specified in "traffic volume measurement object" is being used, UE shall delete that particular measurement and its measurement identity from the variable MEASUREMENT_IDENTITY.

8.4.2 Measurement report

Figure 58: Measurement report, normal case

8.4.2.1 General

The purpose of the measurement reporting procedure is to transfer measurement results from the UE to UTRAN.

8.4.2.2 Initiation

In CELL_DCH state, the UE shall transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are met for any ongoing measurements that are being performed in the UE.

In CELL_FACH state, the UE shall transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are met for any ongoing traffic volume measurement or UE positioning measurement that is being performed in the UE.

In TDD, if the Radio Bearer associated with the MEASUREMENT_IDENTITY fulfilling the reporting criteria for an ongoing traffic volume measurement is mapped on transport channel of type USCH, the UE shall initiate the "PUSCH CAPACITY REQUEST" procedure instead of transmitting a MEASUREMENT REPORT (TDD Only).

In CELL_PCH or URA_PCH state, the UE shall first perform the cell update procedure according to subclause 8.3.1, using the cause "uplink data transmission", in order to transit to CELL_FACH state and then transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are fulfilled for any ongoing traffic volume measurement or UE positioning measurement which is being performed in the UE.

The reporting criteria are fulfilled if either:

- the first measurement has been completed according to the requirements set in [19] or [20] for a newly initiated measurement with periodic reporting; or
- the time period indicated in the stored IE "Periodical reporting criteria" has elapsed since the last measurement report was submitted to lower layers for a given measurement; or
- an event in stored IE "Measurement reporting criteria" was triggered. Events and triggering of reports for different measurement types are described in detail in clause 14.

For the measurement, which triggered the MEASUREMENT REPORT message, the UE shall:

- set the IE "measurement identity" to the measurement identity, which is associated with that measurement in variable MEASUREMENT_IDENTITY;
- set the IE "measured results" to include measurements according to the IE "reporting quantity" of that measurement stored in variable MEASUREMENT_IDENTITY; and
  - if all the reporting quantities are set to "false":
    - not set the IE "measured results";
- set the IE "Measured results" in the IE "Additional measured results" according to the IE "reporting quantity" for all measurements associated with the measurement identities included in the IE "additional measurements" stored in variable MEASUREMENT_IDENTITY of the measurement that triggered the measurement report; and

- if more than one additional measured results are to be included:
  - sort them in ascending order according to their IE "measurement identity" in the MEASUREMENT REPORT message;
- if the MEASUREMENT REPORT message was triggered by an event (i.e. not a periodical report):
  - set the IE "Event results" according to the event that triggered the report.

The UE shall:

- transmit the MEASUREMENT REPORT message on the uplink DCCH using either AM or UM RLC according to the stored IE "measurement reporting mode" associated with the measurement identity that triggered the report.

When the MEASUREMENT REPORT message has been submitted to lower layers for transmission:

- the procedure ends.

8.4.3 Assistance Data Delivery

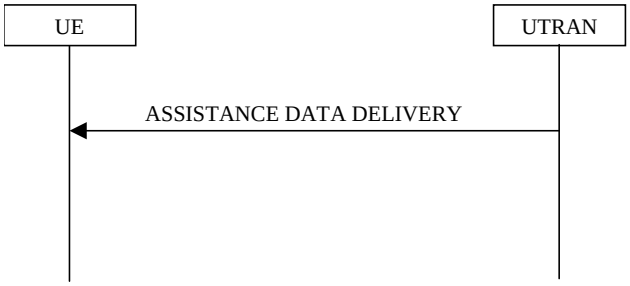

Figure 59 Assistance Data Delivery

8.4.3.1 General

The purpose of the assistance data delivery procedure is to transfer UE positioning related assistance data from the UTRAN to the UE.

8.4.3.2 Initiation

When requested by the Core Network ~~T~~the UTRAN may deliver UE positioning related assistance data with an ASSISTANCE DATA DELIVERY message, which is transmitted on the downlink DCCH using AM RLC

8.4.3.3 Reception of ASSISTANCE DATA DELIVERY message by the UE

Upon reception of a ASSISTANCE DATA DELIVERY message the UE shall:

- if IE "UE positioning OTDOA assistance data for UE-based " is included:
  - ~~store the OTDOA assistance data;~~act as specified in subclause 8.6.7.19.2a;
- if IE "UE positioning GPS assistance data" is included:
  - ~~store the GPS assistance data.~~act as specified in subclause 8.6.7.19.3;

8.4.3.4 Invalid ASSISTANCE DATA DELIVERY message

If the UE receives a ASSISTANCE DATA DELIVERY message, which contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit an RRC STATUS message on the uplink DCCH using AM RLC;
- include the IE "Identification of received message"; and
- set the IE "Received message type" to ASSISTANCE DATA DELIVERY; and
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the ASSISTANCE DATA DELIVERY message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry;
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- when the RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid ASSISTANCE DATA DELIVERY message has not been received.

8.5.11 FACH measurement occasion calculation

When in CELL_FACH state and when the variable C_RNTI is non-empty the UE in FDD mode shall perform ~~inter-frequency and inter system~~ measurements as specified in section 8.4.1.6 and 8.4.1.8 during the frame(s) with the SFN value fulfilling the following equation:

$$SFN \text{ div } N = C\_RNTI \bmod M\_REP + n * M\_REP$$

where

- N is the TTI (in number of 10ms frames) of the FACH having the largest TTI on the SCCPCH monitored by UE
- C_RNTI is the C-RNTI value of the UE stored in the variable C_RNTI
- M_REP is the Measurement Occasion cycle length. According to the equation above, a FACH Measurement Occasion of N frames will be repeated every N * M_REP frame, and $M\_REP = 2^k$.

  where,

  - k is the FACH Measurement occasion cycle length coefficient.
    The value of the FACH Measurement occasion cycle length coefficient is read in system information in "System Information Block type 11" or "System Information Block type 12" in the IE "FACH measurement occasion info".
- n = 0,1,2… as long as SFN is below its maximum value

The UE is allowed to measure on other occasions in case the UE moves "out of service" area or in case it can simultaneously perform the ordered measurements.

A UE in TDD mode shall use the frame(s) with the SFN value fulfilling the above equation for neighbour cells measurements.

8.6.7.1 Measurement validity

If the ~~optional~~ IE "measurement validity" for a given measurement has not been included in measurement control information, the UE shall delete the measurement associated with the variable MEASUREMENT_IDENTITY after the UE makes a transition to a new state.

If the IE "measurement validity" for this measurement has been included in measurement control information, the UE shall save the measurement associated with the variable MEASUREMENT_IDENTITY. The IE "UE state" defines the scope of resuming the measurement.

If the "UE state" is defined as "all states", the UE shall continue the measurement after making a transition to a new state. This scope is assigned ~~only~~ for traffic volume ~~type~~ measurement~~s~~ type and UE positioning measurement type. For traffic volume measurement type~~and~~ this scope can only be applied by the UE if the IE " traffic volume measurement object" has been included in measurement control information. If the IE " traffic volume measurement object" has not been included in measurement control information, the UE shall not save the measurement control information in variable MEASUREMENT_IDENTITY, but shall send a MEASUREMENT CONTROL FAILURE message to the UTRAN with failure cause "Configuration incomplete".

If the "UE state" is defined as "all states except CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition from CELL_DCH state to any of the other states in connected mode. This scope is assigned ~~only~~ for traffic volume ~~type~~ measurement~~s~~ type or UE positioning measurement type.

If the "UE state" is defined as "CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition to CELL_DCH state. After cell re-selection, the UE shall delete any ongoing intra-frequency or inter-frequency and inter-RAT type measurement associated with the variable MEASUREMENT_IDENTITY. Other measurement types shall, however, be continued regardless of cell reselection.

8.6.7.18a UE positioning measurement

If IE "UE positioning measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "UE positioning reporting quantity" or "CHOICE report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19 UE positioning

8.6.7.19.0 UE positioning reporting criteria

If IE "UE positioning reporting criteria" is included, the UE shall,

- perform the necessary measurements and evaluate the event in the interval indicated in IE "Measurement Interval";
- If IE "Event ID" is set to "7a" and if IE "Report first fix" is set to TRUE,
  - if the IE "Method Type" included in the variable MEASUREMENT_IDENTITY is set to "UE based":
    - act as specified in section 8.6.7.19.1b;

8.6.7.19.1 UE positioning reporting quantity

The UE shall:

- ignore IE "Multiple Sets";
- ignore IE "Response Time";
- if IE "Horizontal Accuracy" and/or IE "Vertical Accuracy" is included:
  - should try to achieve the requested level(s) of positioning accuracy with 67% confidence;
- if IE "Positioning Methods" is set to "Cell ID":
  - ~~and if UE is in CELL_DCH state~~
  - ~~perform the Rx-Tx time difference type 2 measurement on the reference cell indicated in the OTDOA assistance data~~act as specified in section 8.6.7.19.1a;
- if the IE "Method Type" is set to "UE based":
  - act as specified in section 8.6.7.19.1b;
  - ~~if the IE "Positioning Methods" is set to "GPS":~~
    - ~~when a measurement report is triggered:~~
      - ~~include the IE "UE positioning position estimate info" in the measurement report and set the contents of the IE as follows:~~
        - ~~if the UE supports the capability to provide the GPS timing of the cell, and~~
        - ~~if the IE "GPS timing of Cell wanted" is set to true:~~
          - ~~include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and~~
          - ~~include the IE "Reference SFN", the IE "GPS TOW msec"; and~~

~~- the UE may include the IE "GPS TOW rem usec";~~

~~- if the IE "Positioning Methods" is set to "OTDOA":~~

~~- when a measurement report is triggered:~~

~~- include the IE "UE positioning position estimate info" in the measurement report;~~

- if the IE "Method Type" is set to "UE assisted":

- act as specified in section 8.6.7.19.1a;

- if the IE “Method Type” is set to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”:

- ~~act either~~ act either according to section 8.6.7.19.1a or 8.6.7.19.1b depending on the method type chosen by the UE.

~~- if the IE "Positioning Methods" is set to "GPS":~~

~~- when a measurement report is triggered:~~

~~- include the IE "UE positioning GPS measured results" in the measurement report and set the contents of the IE as follows:~~

~~- if the UE supports the capability to provide the GPS timing of the cell, and~~

~~- if the IE "GPS timing of Cell wanted" is set to true:~~

~~- include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and~~

~~- include the IE "Reference SFN", the IE "GPS TOW msec"; and~~

~~- the UE may include the IE "GPS TOW rem usec";~~

~~- if the UE does not support the capability to provide the GPS timing of the cell:~~

~~- include the IE "GPS TOW msec";~~

~~- if the IE "Positioning Methods" is set to "OTDOA":~~

~~- when a measurement report is triggered:~~

~~- include the IE "UE positioning OTDOA measured results" in the measurement report.~~

If UE according to its capabilities supports Rx-Tx time difference type 2 measurement and if IE "Positioning Methods" is set to "Cell ID" and the IE "Measurement validity" stored in the variable MEASUREMENT_IDENTITY is other than "CELL_DCH", the UE shall:

- set the variable ~~INVALID_~~CONFIGURATION_INCOMPLETE to TRUE, and

- act as specified in subclause 8.4.1.4b.

The UE shall perform the following consistency check:

- if UE, according to its capabilities, does not support UE based OTDOA and if IE "Positioning Methods" is set to "OTDOA" and if IE "Method Type" is set to "UE based":

- ~~act as specified in subclause 8.4.1.4~~set the variable CONFIGURATION_INCOMPLETE to TRUE;

- if UE, according to its capabilities, does not support UE based GPS and if IE "Positioning Methods" is set to "GPS" and if IE "Method Type" is set to "UE based":

- set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~;

- if UE, according to its capabilities, does not support UE assisted GPS and if IE "Positioning Methods" is set to "GPS" and if IE "Method Type" is set to "UE assisted":

- set the variable CONFIGURATION_INCOMPLETE to TRUEact as specified in subclause 8.4.1.4;

- if UE, according to its capabilities, does not support UE based positioning and if IE "Positioning Methods" is set to "OTDOAorGPS" and if IE "Method Type" is set to "UE based":

  - set the variable CONFIGURATION_INCOMPLETE to TRUEact as specified in subclause 8.4.1.4;

- if UE, according to its capabilities, does not support Rx-Tx time difference type 2 measurement and if IE "Positioning Methods" is set to "Cell ID":

  - set the variable CONFIGURATION_INCOMPLETE to TRUEact as specified in subclause 8.4.1.4.

- if UE, according to its capabilities, does not support UE GPS timing of cell frames measurement and if IE "GPS timing of Cell wanted" is set to TRUE:

  - set the variable CONFIGURATION_INCOMPLETE to TRUEact as specified in subclause 8.4.1.4.

- if UE according to its capabilities supports Rx-Tx time difference type 2 measurement and is in any other state than CELL_DCH state and if IE "Positioning Methods" is set to "Cell ID":

  - act as specified in subclause 8.4.1.4b.

8.6.7.19.1a UE positioning reporting for UE assisted methods

When a measurement report is triggered, and

- if higher layers have indicated that user permission is required for the locationpositioning request is permitted and the user has given his/her permission and

  - if the UE was able to perform measurements on is able to report measurement results from at least one neighbour cell in case of OTDOA or one satellite in case of GPS positioning, respectively, the UE shall

    - if the IE "Vertical Accuracy" is included:

      - interpret the presence of this IE to indicate that the UTRAN desires to compute a 3-dimensional position estimate.

    - if the IE "Positioning Methods" is set to "GPS":

      - include the IE "UE positioning GPS measured results" in the measurement report and set the contents of the IE as follows:

        - if the UE supports the capability to provide the GPS timing of the cell frames measurement, and

          - if the IE "GPS timing of Cell wanted" is set to TRUEtrue:

            - perform the UE GPS timing of cell frames measurement on the reference cell indicated in the IE “UE positioning GPS reference cell info”;

            - if the UE is unable to measure the GPS timing of cell frames of the reference cell indicated in the IE “UE positioning GPS reference cell info”:

              - perform the UE GPS timing of cell frames measurement on the serving cell or on one cell of the active set;

            - include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and

            - include the IE "Reference SFN" and, the IE "UE GPS timing of cell framesTOW msec"; and

            - the UE may include the IE "GPS TOW rem usec";

        - if the UE does not support the capability to provide the GPS timing of the cell, or

- if the IE "GPS timing of Cell wanted" is set to FALSE:
  - include the IE "GPS TOW msec";

- if the IE "Positioning Methods" is set to "OTDOA":

~~- not include the IE"UE positioning OTDOA measured results" in the measurement extension,~~

- include the IE "UE positioning OTDOA measured results ~~extension~~" in the measurement report and set the contents of the IE as follows:
  - set IE "SFN" to the SFN when the last measurement was performed
  - if the UE supports the capability to ~~is capable of~~ perform~~ing~~ the Rx-Tx time difference type 2 measurement, and
    - if the UE is in CELL_DCH state:
      - if the measured value is equal to "1279.9375":
        - set the IE "Rx-Tx time difference type 2" in IE "UE positioning OTDOA measured results" for the reference cell to "1279.8750";

~~-~~ - otherwise:

      - set the IE "Rx-Tx time difference type 2" in IE "UE positioning OTDOA measured results" for the reference cell to the measured value;
      - include the IE group "Rx-Tx time difference type 2 info" for the reference cell and for each neighbour cell listed in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED that belongs to the active set;
  - if the UE does not support the capability to perform the Rx-Tx time difference type 2 measurement:
    - set the IE "Rx-Tx time difference type 2" in IE "UE positioning OTDOA measured results" for the reference cell to value "1279.9375" to indicate that the measurement is not supported;
  - include IE group "Neighbour" for all neighbour cells listed in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED on which the SFN-SFN observed time difference type 2 measurement could be performed;

- if IE "Positioning Methods" in the MEASUREMENT CONTROL message has been assigned to value "OTDOA or GPS":
  - the UE may choose to either act as if IE "Positioning Methods"is set to "GPS" or "OTDOA" depending on the method chosen by the UE.

- if the IE "Positioning Methods" is set to "CELL ID":
  - if the UE supports the capability to ~~is capable of~~ perform~~ing~~ the Rx-Tx time difference type 2 measurement, and
  - if the UE is in CELL_DCH state:
    - perform the Rx-Tx time difference type 2 measurement on the reference cell indicated in the IE "UE positioning OTDOA assistance data", and
    - report the measurement results back to the network in the ~~RRC~~ MEASUREMENT REPORT by using IE "UE positioning OTDOA measured results ~~extension~~" excluding any measurements on neighbour cells in this IE

- if the UE is not able to report the requested~~any~~ measurement results, or ~~the UE shall~~

~~- include IE "UE positioning error" in the MEASUREMENT REPORT and set the contents of this IE as follows:~~

- if the IE "Positioning Methods" in IE "UE positioning reporting quantity" has been assigned to value "OTDOA" and no neighbour cells could be received,
  - set IE "Error reason" to "ER1";
- if the IE "Positioning Methods" in IE "UE positioning reporting quantity" has been assigned to value "GPS" and
  - if there were not enough GPS satellites to be received,
    - set IE "Error reason" to "ER2";
  - if some GPS assistance data was missing,
    - set IE "Error reason" to "ER3";
  - if the UE is in CELL_DCH state and the reference cell indicated in IE "UE positioning GPS reference time" is not in the active set,
    - set IE "Error reason" to "ER7";
- if higher layers have indicated that user permission is required for the location request and if the user has denied the positioning request,
  - set IE "Error reason" to "ER5"
- if higher layers have indicated that user permission is required for the location request and if the positioning request was not processed by the user and timed out,
  - set IE "Error reason" to "ER6"
- if higher layers have indicated that the positioning request is not permitted, or
- if the positioning request was not processed by higher layers and timed out,
  - include IE "UE positioning error" in the MEASUREMENT REPORT and set the contents of this IE as specifiefied in section 8.6.7.19.5

8.6.7.19.1b UE positioning reporting for UE based methods

When a measurement report is triggered and

- if higher layers ~~have~~ indicated that ~~user permission is required for the location~~the positioning request is permitted~~and the user has given his/her permission~~ and
  - and if the UE has been able to calculate a position, the UE shall
    - include IE "UE positioning Position Estimate Info" in the MEASUREMENT REPORT and set the contents of the IE as follows:
      - if the UE supports the capability to ~~is capable of~~ perform~~ing~~ the UE GPS timing of cell frames measurement and UTRAN has requested to report the GPS timing of cell frames, the UE shall
        - perform the UE GPS timing of cell frames measurement on the reference cell indicated in the IE "UE positioning GPS reference cell info"
        - if the UE is unable to measure the GPS timing of cell frames of the reference cell indicated in the IE "UE positioning GPS reference cell info":
          - perform the UE GPS timing of cell frames measurement on the serving cell or on one cell of the active set.
        - include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD;
        - include the SFN when the position was determined;
        - include the IE "UE GPS ~~TOW in msec~~timing of cell frames"; ~~and "GPS TOW in rem usec";~~

- if the UE does not supports the capability to perform the UE GPS timing of cell frames measurement, or
- if the IE "GPS timing of Cell wanted" is set to FALSE, the UE shall
  - include the IE “GPS TOW msec”;
- if IE “Vertical Accuracy” has been included in IE “UE positioning reporting quantity” and
  - if the IE “Vertical Accuracy” has been assigned to value “0” and
    - if the IE “Horizontal Accuracy” has been assigned a value “0”, the UE may
      - include IE “Ellipsoid point with altitude”;
    - if the IE “Horizontal Accuracy” has been assigned a value unequal to “0” and
    - if the UE has been able to calculate a 3-dimensional position, the UE shall
      - include IE “Ellipsoid point with altitude” or IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate;
    - if the UE has not been able to calculate a 3-dimensional position, the UE may
      - act as if IE “Vertical Accuracy” was not included in IE “UE positioning reporting quantity”;
  - if the IE “Vertical Accuracy” has been assigned to a value unequal to “0” and
    - if the UE has been able to calculate a 3-dimensional position, the UE shall
      - include IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate;
    - if the UE has not been able to calculate a 3-dimensional position, the UE shall
      - act as if IE “Vertical Accuracy” has not been included in IE “UE positioning reporting quantity”;
- if IE “Vertical Accuracy” has not been included in IE “UE positioning reporting quantity” and
  - if IE “Horizontal Accuracy” in IE “UE positioning reporting quantity” has been assigned to value “0”, the UE may:
    - include IE “Ellipsoid point”;
  - if IE “Horizontal Accuracy” in IE “UE positioning reporting quantity” has been assigned to a value unequal to 0, the UE shall
    - include either IE “Ellipsoid point with uncertainty circle” or IE “Ellipsoid point with uncertainty ellipse” or IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate.

~~and~~

~~- if the UE is in CELL_DCH state and the reference cell indicated in IE “UE positioning GPS reference time” is not in the active set,~~

~~- set IE “Error reason” to “ER7”;~~

~~NOTE1: It is assumed that in any other than CELL_DCH state the UE should be able to find the timing between reference cell and GPS TOW. Is this assumption correct?~~

~~NOTE2: Is it possible that the UE is not able to perform measurements, because the GPS reference time could not be obtained?~~

~~- if the IE “Positioning Methods” in IE “UE positioning reporting quantity” has been assigned to value “OTDOA or GPS”,~~

act either as if IE "Positioning Methods" has been assigned to value "GPS" or "OTDOA" depending on the method chosen by the UE;

- if the UE was not able to calculate a position, or
- if higher layers have indicated that the positioning request is not permitted, or
- if the positioning request was not processed by higher layers and timed out, if higher layers have indicated that user permission is required for the location request and if the user has denied the positioning request,

set IE "Error reason" to "ER5"

if higher layers have indicated that user permission is required for the location request and if the positioning request was not processed by the user and timed out,

- set IE "Error reason" to "ER6"include IE "UE positioning error" in the MEASUREMENT REPORT and set the contents of this IE as specifiefied in section 8.6.7.19.5

8.6.7.19.2 UE positioning OTDOA assistance data for UE-assisted

If IE "UE positioning OTDOA reference cell info for UE-assisted" is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the UE positioning reference cell info in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED, overwriting any existing information.

If IE "UE positioning OTDOA neighbour cell list for UE assisted" is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the neighbour cell info list in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTEDCELL_INFO_LIST, overwriting any existing information.

If, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells, the UE shall:

- ignore this IE.

If IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message, the UE shall also perform the following consistency checks:

- if IE "Positioning Methods" is set to "OTDOA" or "Cell ID":
  - if IE "UE positioning OTDOA reference cell info for UE assisted" is not included and if UE positioning OTDOA reference cell info for UE assisted in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED is empty:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA neighbour cell list for UE assisted" is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list for UE assisted in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;

if IE "Method Type" is set to "UE based":

if IE "UE positioning OTDOA reference cell info" is included and if IE "Cell Position" for the reference cell is not included:

~~- set the variable CONFIGURATION_INCOMPLETE to TRUE;~~

~~- if the IE "UE positioning OTDOA neighbour cell list" is included and if cell position of less than two neighbour cells of the cells included in this IE and stored in variable UE_POSITIONING_OTDOA_DATA are different and if those cell positions are not different to the one of the reference cell stored in variable UE_POSITIONING_OTDOA_DATA:~~

~~- set the variable CONFIGURATION_INCOMPLETE to TRUE;~~

~~- if the IE "UE positioning OTDOA neighbouring cell list" is included and only two neighbour cells are included or stored in variable UE_POSITIONING_OTDOA_DATA and if the IE "Round Trip Time" is neither included for the neighbour cells nor for the reference cell info:~~

~~- set the variable CONFIGURATION_INCOMPLETE to TRUE.~~

8.6.7.19.2a UE positioning OTDOA assistance data for UE-based

If IE "UE positioning OTDOA reference cell info for UE-based" is received in System Information Block type 15.54 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly. The UE shall:

- store received cell information in the UE positioning reference cell info for UE based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

If IE "UE positioning OTDOA neighbour cell list for UE based~~assisted~~" is received in System Information Block type 15.54 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly. The UE shall:

- store received cell information in the neighbour cell info list for UE based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

If, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells, the UE shall:

- ignore this IE.

If IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message, the UE shall also perform the following consistency checks:

- if IE "Positioning Methods" is set to "OTDOA"~~ or "Cell ID"~~:
  - if IE "UE positioning OTDOA reference cell info for UE based" is not included and if UE positioning OTDOA reference cell info for UE based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED is empty:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA neighbour cell list for UE based" is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list for UE based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
  - if IE "Method Type" is set to "UE based":
    - if IE "UE positioning OTDOA reference cell info for UE based" is included and if IE "Cell Position" for the reference cell is not included:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE;
    - if the IE "UE positioning OTDOA neighbour cell list for UE based" is included and if cell position of less than two neighbour cells of the cells included in this IE and stored in variable

UE_POSITIONING_OTDOA_DATA_UE_BASED are different and if those cell positions are not different to the one of the reference cell stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:

- set the variable CONFIGURATION_INCOMPLETE to TRUE;

- if the IE "UE positioning OTDOA neighbouring cell list for UE-based " is included and only two neighbour cells are included or stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED and if the IE "Round Trip Time" is neither included for the neighbour cells nor for the reference cell info:

  - set the variable CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19.3 UE positioning GPS assistance data

The UE may receive GPS assistance data in System Information Block types 15, 15.1, 15.2, or 15.3, or in the ASSISTANCE DATA DELIVERY message, or in the MEASUREMENT CONTROL message.

8.6.7.19.3.1 UE positioning GPS acquisition assistance

If the IE "UE positioning GPS acquisition assistance" is included, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:

  - delete all information currently stored in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA;

  - store the received acquisition assistance information in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA;

- store the IE "GPS TOW msec" ~~;~~

  ~~-~~in the IE "UE positioning GPS acquisition assistance" ~~,~~in variable UE_POSITIONING_GPS_DATA and

  ~~-~~use it as an estimate of the current GPS Time-of-Week;

- if the IEs "SFN"and "UTRAN GPS timing of cell frames" ~~is~~are included:

  - if the UE is able to utilise these IEs:

    - store these~~is~~ IEs in the IE "UE positioning GPS acquisition assistance " in variable UE_POSITIONING_GPS_DATA;

    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not included and

      - if the UE is not in CELL_DCH state:

        - use IEs "SFN" and "UTRAN GPS timing of cell frames" to estimate the relationship between GPS time and radio~~air~~ interface timing of the NODE B transmission in the serving cell;

      - if the UE is in CELL_DCH state:

        - ignore IEs "SFN" and "UTRAN GPS timing of cell frames";

    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:

      - store this IE in the IE "UE positioning acquisition assistance~~GPS reference time~~" in variable UE_POSITIONING_GPS_DATA;

      - use IEs "SFN" and "UTRAN GPS timing of cell frames" to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";

~~- use IE "GPS TOW msec" as an estimate of the current GPS Time-of-Week;~~

- ~~if the IEs "SFN" and "GPS TOW rem usec" are included and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not included:~~
  - ~~use them with IE "GPS TOW msec" to estimate the relationship between GPS time and air interface timing of the NODE B transmission in the serving cell;~~
- ~~if the IEs "SFN" and "GPS TOW rem usec" are included and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:~~
  - ~~use them with IE "GPS TOW msec" to estimate the relationship between GPS time and air interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";~~
- ~~for each satellite:~~
  - ~~if the IE "SFN" is included, interpret the IE "Code Phase Search Window" to include the uncertainty between GPS time and UTRAN timing for the NODE B transmission of the cell concerned.~~
- ~~store IE "GPS reference time" in the IE "UE positioning reference time" in UE_POSITIONING_GPS_DATA;~~
- ~~for each satellite:~~
  - ~~update the variable UE_POSITIONING_GPS_DATA as follows:~~
    - ~~store received GPS acquisition assistance at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position.~~

8.6.7.19.3.2 UE positioning GPS Almanac

If the IE "UE positioning GPS Almanac" is included, ~~for each satellite,~~ the UE shall:

- ~~store IE "WNa" in the IE "UE positioning GPS Almanac" in variable UE_POSITIONING_GPS_DATA and interpret it to be the GPS week associated with the received almanac information;~~
- if the IE "SV Global Health" is included:
  - store this IE in the IE in the IE "SV Global Health" in the IE "UE positioning GPS Almanac" in variable UE_POSITIONING_GPS_DATA.
- for each satellite:
  - ~~update the variable UE_POSITIONING_GPS_DATA as follows:~~
  - ~~store IE "WNa" in the IE "WNa" at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS almanac" in variable UE_POSITIONING_GPS_DATA and interpret it to be the GPS week associated with the received almanac information;~~
  - store received GPS almanac information at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS Almanac" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position. [changed indentation]
  - interpret IE "Data ID" as the Data ID field contained in the indicated subframe, word 3, most significant 2 bits, as defined by [12];
  - act on the rest of the IEs in a similar manner as specified in [12].

8.6.7.19.3.3 UE positioning D-GPS Corrections

If the IE "UE positioning GPS DGPS corrections" is included, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:
  - delete all information currently stored in the IE "UE positioning GPS DGPS corrections" in the variable UE_POSITIONING_GPS_DATA;[changed indentation]

- store the received DGPS corrections in the IE "UE positioning GPS DGPS corrections" in the variable UE_POSITIONING_GPS_DATA.[changed indentation]

- use IE "GPS TOW sec" to determine when the differential corrections were calculated;

- use IE "Status/Health" to determine the status of the differential corrections;

- act on "DGPS information" in a similar manner as specified in [13] except that the scale factors for PRC and RRC are different, and

- use IEs Delta-PRC2 and Delta-RRC2 to extend the life of the ephemeris and clock correction data up to 6 hours;

- if IEs Delta-PRC3 and Delta-RRC3 are included:

  - use them to extend the life of the ephemeris and clock correction data up to 8 hours.

8.6.7.19.3.3a UE positioning GPS Navigation Model

If the IE “UE positioning GPS Navigation Model” is included, for each satellite, the UE shall:

- use IE "Satellite Status” to determine if an update of IE “UE positioning GPS Ephemeris and Clock Correction parameters” has been provided for the satellite indicated by the IE “SatID”;

- if an update has been provided for this satellite

  - act as specified in subclause 8.6.7.19.3.4.

8.6.7.19.3.4 UE positioning GPS Ephemeris and Clock Correction Parameters

If the IE "UE positioning GPS Ephemeris and Clock Correction parameters" is included, for each satellite, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:

  - store this IE~~received GPS ephemeris information~~ at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS Navigation Model" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position.

- act on these GPS ephemeris and clock correction parameters in a manner similar to that specified in [12].

8.6.7.19.3.5 UE positioning GPS ionospheric model

If IE "UE positioning GPS ionospheric model" is included, the UE shall:

- store this IE in the IE "UE positioning GPS ionospheric model" in variable UE_POSITIONING_GPS_DATA

- act on these GPS ionospheric model parameters in a manner similar to that specified in [12].~~-~~

8.6.7.19.3.6 UE positioning GPS real-time integrity

~~The GPS real-time integrity information element specified in subclause 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.~~

If this list of bad satellites is included,~~ for each satellite,~~ the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows

  - add the Sat IDs that are not yet included in the list of satellites in the IE "UE positioning GPS real time integrity" in the variable UE_POSITIONING_GPS_DATA; [changed indentation]

  - remove all Sat IDs in the list of satellites in the IE "UE positioning GPS real time integrity" in the variable UE_POSITIONING_GPS_DATA that are not included in IE UE positioning GPS real time integrity;~~.~~ [changed indentation]

- consider the data associated with the satellites identified in the variable UE_POSITIONING_GPS_DATA as invalid.

8.6.7.19.3.7 UE positioning GPS reference time

If the IE "UE positioning GPS reference time" is included, the UE shall:

- store ~~this~~ IE "GPS Week" in "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and use it as the current GPS week;

- store the IE "GPS TOW msec" ~~:~~

~~-~~ in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and

~~-~~ use it as an estimate of the current GPS Time-of-Week;

- if the IE "SFN"and IE "UTRAN GPS timing of cell frames" are included:

  - if the UE is able to utilise the IEs:

    - store these IEs in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA;

    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not includedand~~:~~

      - if the UE is not in CELL_DCH state:

        - use IEs "SFN" and "UTRAN GPS timing of cell frames~~GPS TOW msec~~" to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the serving cell;

      - if the UE is in CELL_DCH state:

        - ignore IEs "SFN" and "UTRAN GPS timing of cell frames";

    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:

      - store this IE in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA;

      - use IEs "SFN" and "UTRAN GPS timing of cell frames~~GPS TOW msec~~" to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";

- if the IE "SFN-TOW Uncertainty" is included:

  - store this IE in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and use it to determine if the relationship between GPS time and air-interface timing of the NODE B transmission is known to within at least 10ms;

  ~~- if the IE "GPS TOW rem usec" is included:~~

    ~~- store this IE in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it to refine the resolution of its GPS time estimate;~~

- if the IE "$T_{UTRAN-GPS}$ drift rate~~NODE B Clock Drift~~" is included:

  - store this IE in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and

  - may use it as an estimate of the drift rate of the NODE B clock relative to GPS time;

- if the IE "GPS TOW Assist" is included:

  - for each satellite: [indentation changed]

- delete all information currently stored in the IE "GPS TOW Assist" ~~store received GPS TOW assist information at the position indicated by the IE "Sat ID"~~ in the IE "UE positioning GPS reference time" in the variable UE_POSITIONING_GPS_DATA~~, possibly overwriting any existing information in this position~~. [indentation changed]

- store the received GPS TOW Assist information in the IE "UE positioning GPS reference time" in the variable UE_POSITIONING_GPS_DATA.

8.6.7.19.3.8 UE positioning GPS reference UE position

If the IE "UE positioning GPS reference UE position" is included, the UE shall:

- store this IE in the IE "UE positioning GPS reference UE position" in variable UE_POSITIONING_GPS_DATA, and

- use it as a priori knowledge of the approximate location of the UE.

8.6.7.19.3.9 UE positioning UTC model

If the IE "UE positioning GPS UTC model" is included, the UE shall:

- store this IE in the IE "UE positioning GPS UTC model" in variable UE_POSITIONING_GPS_DATA.

8.6.7.19.4 UE positioning Ciphering info

If deciphering information is received from higher layers for deciphering of GPS assistance data broadcast on system information, the UE shall:

- store the current key in IE "Current deciphering key" in variable UE_POSITIONING_GPS_DATA;

- store the next key in IE "Next deciphering key" in variable UE_POSITIONING_GPS_DATA;

- store the ciphering key flag in UE_POSITIONING_GPS_DATA.

If deciphering information is received from higher layers for deciphering of OTDOA assistance data broadcast on system information, the UE shall:

- store the current key in IE "Current deciphering key" in variable UE_POSITIONING_OTDOA_DATA_UE_BASED;

- store the next key in IE "Next deciphering key" in variable UE_POSITIONING_OTDOA_DATA_UE_BASED;

- store the ciphering key flag in UE_POSITIONING_OTDOA_DATA_UE_BASED.

If the IE "GPS Data ciphering info" is included in SIB15, the UE shall:

- select one of the two deciphering keys received and store~~d~~ it in UE_POSITIONING_GPS_DATA according to the following:

  - if the value of the received IE "Ciphering Key Flag" is the same as the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_GPS_DATA:

    - select the current deciphering key;

  - if the value of the received IE "Ciphering Key Flag" is different from the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_GPS_DATA:

    - select the next deciphering key;

- store the received IE in the variable UE_POSITIONING_GPS_DATA;

- use the selected deciphering key to decipher the broadcast UE positioning GPS information contained within the System Information Block types 15.1, 15.2 and 15.3.

If the IE "OTDOA positioning ciphering info" is included in SIB15.4, the UE shall:

- select one of the two deciphering keys and stored it in UE_POSITIONING_OTDOA_DATA_UE_BASED according to the following:
  - if the value of the received IE "Ciphering Key Flag" is the same as the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
    - select the current deciphering key;
  - if the value of the received IE "Ciphering Key Flag" is different from the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
    - select the next deciphering key;
- store the received IE in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED;
- use the selected deciphering key to decipher the IE "OTDOA assistance data" included in the System Information Block types 15.4.

8.6.7.19.5 UE positioning Error

The UE shall set the contents of the IE "UE positioning Error" as follows:

- if the IE “Positioning Methods” in IE “UE positioning reporting quantity” has been assigned to value “OTDOA” and no neighbour cells could be received,
  - set IE “Error reason” to “ER1”;
- if the IE “Positioning Methods” in IE “UE positioning reporting quantity” has been assigned to value “GPS” and
  - if there were not enough GPS satellites to be received,
    - set IE “Error reason” to “ER2”;
  - if some GPS assistance data was missing,
    - set IE “Error reason” to “ER3”, and
    - if the IE ""Additional Assistance Data Request" included in the IE "UE positioning reporting quantity" stored in the variable MEASUREMENT_IDENTITY is set to TRUE;
      - include the IE GPS Additional Assistance Data Request"
  - if the UE was not able to read the SFN of the reference cell included in the IE "UE positioning GPS reference time" or in the IE “UE positioning acquisition assistance”,
    - set IE “Error reason” to “ER7”;
  - if the UE was not able to measure the requested GPS timing of cell frames measurement,
    - set IE “Error reason” to “ER8”;
- if higher layers have indicated that the positioning request is not permitted,
  - set IE “Error reason” to “ER5”
- if the positioning request was not processed by higher layers and timed out,,
  - set IE “Error reason” to “ER6”
- if none of the conditions above are fulfilled,
  - set IE "Error reason" to "ER4"

8.6.7.19.6 UE positioning GPS reference cell info

If IE "UE positioning GPS reference cell info" is received in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_GPS_DATA accordingly. The UE shall:

- store received reference cell information in the IE “UE positioning GPS reference cell info” in the variable UE_POSITIONING_GPS_DATA, overwriting any existing information.

8.6.7.20 Void

8.6.7.21 Intra-frequency reporting quantity for RACH reporting

If the IE " Intra-frequency reporting quantity for RACH reporting" is included, the UE shall:

- if the IE "SFN-SFN observed time difference reporting indicator" has the value "type 2":
  - act as if the value of the IE "SFN-SFN observed time difference reporting indicator" is "no reporting".

10.2.4 ASSISTANCE DATA DELIVERY

This message is sent by UTRAN to convey UE positioning assistance data to the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Measurement Information elements				
UE positioning OTDOA assistance data for UE-based	OP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	
UE positioning GPS assistance data	OP		UE positioning GPS assistance data 10.3.7.90	

10.2.48.8.18 System Information Block type 15

The system information block type 15 contains information useful for UE-based or UE-assisted positioning methods.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Data ciphering info	OP		UE positioning Cipher info 10.3.7.86	If this IE is present then the SIB types 15.1, 15.2 & 15.3 are ciphered in accordance with the Data Assistance Ciphering Algorithm specified in [18]
Reference position	MP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	approximate position where the UE is located
GPS reference time	MP		UE positioning GPS reference time 10.3.7.96	
Satellite information	OP	1 to <maxSat>		This IE is present whenever bad (failed/failing) satellites are detected by UTRAN [18].
>BadSatID	MP		Enumerated(0..63)	

10.2.48.8.18.1 System Information Block type 15.1

The system information block type 15.1 contains information useful for UE positioning DGPS Corrections. The DGPS Corrections message contents are based on a Type-1 message of DGPS specified in [13].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
DGPS corrections	MP		UE positioning GPS DGPS corrections 10.3.7.91	

10.2.48.8.18.2 System Information Block type 15.2

The system information block type 15.2 contains information useful for GPS Navigation Model. These IE fields are based on information extracted from the subframes 1 to 3 of the GPS navigation message [12].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Transmission TOW	MP		Integer (0..604799)	The approximate GPS time-of-week when the message is broadcast. in seconds
SatID	MP		Enumerated(0..63)	Satellite ID
GPS Ephemeris and Clock Correction Parameters	MP		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	

10.2.48.8.18.3 System Information Block type 15.3

The system information block type 15.3 contains information useful for ionospheric delay, UTC offset, and Almanac. These IEs contain information extracted from the subframes 4 and 5 of the GPS navigation message, [12].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Transmission TOW	MP		Integer (0..604799)	The approximate GPS time-of-week when the message is broadcast. in seconds
GPS Almanac and Satellite Health	OP		UE positioning GPS almanac 10.3.7.89	
GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
SatMask	CV-*Almanac*		Bit string(1..32)	indicates the satellites that contain the pages being broadcast in this data set
LSB TOW	CV-*Almanac*		Bit string(8)	

Condition	Explanation
Almanac	This IE is mandatory present if the IE "GPS Almanac and Satellite Health" is present

10.2.48.8.18.4 System Information Block type 15.4

The system information block type 15.4 contains ciphering information for SIB 15.5 and information useful for OTDOA ~~based~~ assisted UE Positioning method.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
OTDOA Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	If this IE is present then ~~the IE "OTDOA Assistance Data~~ for UE-based~~"~~ the System Information Block 15.5 is ciphered in accordance with the Data Assistance Ciphering Algorithm specified in [18]
OTDOA assistance data for UE-assisted	OP~~MP~~		UE positioning OTDOA assistance data for UE assisted 10.3.7.103	

~~Condition~~	~~Explanation~~
~~*UEbased*~~	~~This IE is optional if the IE " OTDOA assistance data for UE-based " is included, otherwise the IE is not needed.~~

10.2.48.8.18.4a System Information Block type 15.5

The system information block type 15.5 contains information useful for OTDOA based UE Positioning method.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
OTDOA assistance data for UE-based	MP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	

10.3.3.45 UE positioning capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Standalone location method(s) supported	MP		Boolean	Defines if a UE can measure its location by some means unrelated to UTRAN TRUE means supported
UE based OTDOA supported	MP		Boolean	TRUE means supported
Network Assisted GPS support	MP		Enumerated ('Network based', 'UE based', 'Both', 'None')	Defines if the UE supports network based or UE based GPS methods.
Support for UE GPS timing of cell frames measurement ~~reference time capable~~	MP		Boolean	Defines if a UE has the capability to perform the UE GPS timing of cell frames measurement ~~measure GPS reference time as defined in~~ [7]. TRUE means capable
Support for IPDL	MP		Boolean	Defines if a UE has the capability to use IPDL to enhance its 'SFN-SFN observed time difference –type 2' measurement. TRUE means supported
Support for Rx-Tx time difference type2 measurement	MP		Boolean	TRUE means supported

10.3.7.51 Measurement validity

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE state	MP		Enumerated(CELL_DCH, all states except CELL_DCH, all states)	~~Indicates the states, in which measurement reporting shall be conducted.~~ ~~The values 'all states except CELL_DCH' and 'all states' are used for measurement type 'traffic volume reporting'.~~

10.3.7.86 UE positioning Ciphering info

This IE contains information for the ciphering of UE positioning assistance data broadcast in System Information.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Ciphering Key Flag	MP		Bit string(1)	~~See note 1~~
Ciphering Serial Number	MP		Integer(0..65 535)	The serial number used in the DES ciphering algorithm

~~NOTE 1: The UE always receives two (2) cipher keys during the location update procedure. One of the keys is time-stamped to be current one and the other is time-stamped to be the next one. Thus, the UE always has two cipher keys in memory. The Cipher Key Change Indicator in this broadcast message instructs the UE whether to use current or next cipher key for deciphering the received broadcast message. The UE shall interpret this IE as follows:~~

~~- **Ciphering Key Flag**(previous message) = **Ciphering Key Flag**(this message) => Deciphering Key not changed~~

~~- **Ciphering Key Flag**(previous message) <> **Ciphering Key Flag**(this message) => Deciphering Key changed~~

10.3.7.87 UE positioning Error

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Error reason	MP		Enumerated(ER1, ER2, ER3, ER4, ER5, ER6, ER7, ER8)	Note 1
GPS Additional Assistance Data Request	OP		UE positioning GPS Additional Assistance Data Request 10.3.7.88a	

NOTE 1: The following table gives the mapping of the IE "Error reason"

Value	Indication
ER1	There were not enough cells to be received ~~when performing mobile-based OTDOA-IPDL.~~
ER2	There were not enough GPS satellites to be received~~, when performing UE-based GPS location.~~
ER3	~~Location calculation~~ UE positioning GPS assistance data missing.
~~ER4~~	~~Requested method not supported.~~
ER4~~5~~	Undefined error.
ER5~~6~~	~~Location~~ UE positioning request denied by upper layers~~the user~~.
ER6~~7~~	~~Location~~ UE positioning request not processed by upper layers~~the user~~ and timeout
ER7~~8~~	~~Reference cell for GPS is not the serving cell~~UE was not able to read the SFN of the reference cell
ER8	UE was not able to accomplish the GPS timing of cell frames measurement.

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW msec	MP		Integer(0..6 048*10^3-1)	GPS Time of Week in milliseconds)rounded down to the nearest millisecond unit
>UTRAN GPS reference time	OP			~~GPS Time of Week counted in microseconds, given as GPS TOW in milliseconds and GPS TOW remainder in microseconds. UTRAN reference time in units of 1/16th UMTS chip = 1000(3840 * 16 * GPS TOW msec) + (GPS TOW rem) usec~~
~~>>GPS TOW msec~~	~~MP~~		~~Integer(0..6 048*10^3-1)~~	~~GPS Time of Week in units of 3840 UMTS chips (i.e., milliseconds) (rounded down to the nearest millisecond unit)~~
>>UTRAN GPS timing of cell frames~~TOW rem usec~~	MP		Integer(0 ... 2322431999 9990..61439 999)	GPS ~~Time of Week~~ timing of cell frames in ~~units~~steps of 1/16th chip~~UMTS chip MOD 61440 (where 61440 = 3840 * 16), microseconds MOD 1000.~~
>>CHOICE *mode*	OP			
>>>FDD				
>>>>Primary CPICH Info	M P		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>>>cell parameters id	M P		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>SFN	MP		Integer(0..40 95)	The SFN which the UTRAN GPS timing of cell frames time stamps
~~>GPS reference time only~~				
~~>>GPS TOW msec~~	~~MP~~		~~Integer(0..6 048*10^3-1)~~	~~GPS Time of Week in units of 3840 UMTS chips (i.e., milliseconds (rounded down to the nearest millisecond unit).~~
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0th order term)	MP		Real(-5120..5117.5 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1st order term)	MP		Real (-0.966..0.483 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50, 100,200)	Hz
>Code Phase	MP		Integer(0..10 22)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023 ,1,2,3,4,6,8,1 2,16,24,32,4 8,64,96,128, 192)	Specifies the width of the search window.

>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348.75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.75 by step of 11.25)	Degrees

CHOICE *Reference time*	**Condition under which the given *reference time* is chosen**
UTRAN reference time	The reference time is relating GPS time to UTRAN time (SFN)
GPS reference time only	The time gives the time for which the location estimate is valid

10.3.7.88a UE positioning GPS Additional Assistance Data Request

Information Element/Group name	**Need**	**Multi**	**Type and Reference**	**Semantics description**
Almanac	MP		Boolean	TRUE means requested
UTC Model	MP		Boolean	TRUE means requested
Ionospheric model	MP		Boolean	TRUE means requested
Navigation Model	MP		Boolean	TRUE means requested
DGPS Corrections	MP		Boolean	TRUE means requested
Reference Location	MP		Boolean	TRUE means requested
Reference Time	MP		Boolean	TRUE means requested
Acquisition Assistance	MP		Boolean	TRUE means requested
Real-Time Integrity	MP		Boolean	TRUE means requested
Navigation Model Additional data	CV-*Navigation Model*			this IE is present only if "Navigation Model" is set to TRUE otherwise it is absent
>GPS Week	MP		Integer (0..1023)	
>GPS_Toe	MP		Integer (0..167)	GPS time of ephemeris in hours of the latest ephemeris set contained by the UE
>T-Toe limit	MP		Integer (0..10)	ephemeris age tolerance of the UE to UTRAN in hours
>Satellites list related data	MP	0 to <maxSat>		
>>SatID	MP		Integer (0..63)	
>>IODE	MP		Integer (0..255)	Issue of Data Ephemeris for SatID

10.3.7.89 UE positioning GPS almanac

This IE contains a reduced-precision subset of the ephemeris and clock correction parameters.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
WN_a	MP		Bit string(8)	
Satellite information	MP	1 to <maxSat>		
>DataID	MP		Integer(0..3)	See [12]
>SatID	MP		Enumerated(0..63)	Satellite ID
>e	MP		Bit string(16)	Eccentricity [12]
>t_{oa}	MP		Bit string(8)	Reference Time of AlmanacEphemeris [12]
>δi	MP		Bit string(16)	
>OMEGADOT	MP		Bit string(16)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles/sec) [12]
>SV Health	MP		Bit string(8)	
>$A^{1/2}$	MP		Bit string(24)	Semi-Major Axis (meters)$^{1/2}$ [12]
>$OMEGA_0$	MP		Bit string(24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) [12]
>M_0	MP		Bit string(24)	Mean Anomaly at Reference Time (semi-circles) [12]
>ω	MP		Bit string(24)	Argument of Perigee (semi-circles) [12]
>af_0	MP		Bit string(11)	apparent clock correction [12]
>af_1	MP		Bit string(11)	apparent clock correction [12]
SV Global Health	OP		Bit string(364)	This enables GPS time recovery and possibly extended GPS correlation intervals. It is specified in page 25 of subframes 4 and 5 [12]

10.3.7.90 UE positioning GPS assistance data

This IE contains GPS assistance data.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning GPS reference time	OP		UE positioning GPS reference time 10.3.7.96	
UE positioning GPS reference UE position	OP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	A priori knowledge of UE 3-D position.
UE positioning GPS DGPS corrections	OP		UE positioning GPS DGPS corrections 10.3.7.91	
UE positioning GPS navigation model	OP		UE positioning GPS navigation model 10.3.7.94	
UE positioning GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
UE positioning GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
UE positioning GPS almanac	OP		UE positioning GPS almanac 10.3.7.89	
UE positioning GPS acquisition assistance	OP		UE positioning GPS acquisition assistance 10.3.7.88	
UE positioning GPS real-time integrity	OP		UE positioning GPS real-time integrity 10.3.7.95	
UE positioning GPS reference cell info	OP		UE positioning GPS reference cell info 10.3.7.95a	Identifies reference cell associated with request for UE GPS timing of cell frames measurement

10.3.7.90a Void

10.3.7.91 UE positioning GPS DGPS corrections

This IE contains DGPS corrections to be used by the UE.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW sec	MP		Integer(0..604799)	seconds GPS time-of-week when the DGPS corrections were calculated
Status/Health	MP		Enumerated(UDRE scale 1.0, UDRE scale 0.75, UDRE scale 0.5, UDRE scale 0.3, UDRE scale 0.2, UDRE scale 0.1, no data, invalid data)	
~~DPGS~~ DGPS information	CV-*Status/Health*	1 to <maxSat>		If the Cipher information is included these fields are ciphered.
>SatID	MP		Enumerated (0…63)	
>IODE	MP		Integer(0..255)	
>UDRE	MP		Enumerated(UDRE ≤ 1.0 m, 1.0m < UDRE ≤ 4.0m, 4.0m < UDRE ≤ 8.0m, 8.0m < UDRE)	The value in this field shall be multiplied by the UDRE Scale Factor in the IE Status/Health to determine the final UDRE estimate for the particular satellite.
>PRC	MP		Real(-655.04..655.04 by step of 0.32)	meters (different from [13])
>RRC	MP		Real(-4.064..4.064 by step of 0.032)	meters/sec (different from [13])
>Delta PRC2	MP		Integer(-127..127)	meters
>Delta RRC2	MP		Real(-0.224..0.224 by step of 0.032)	meters/sec
>Delta PRC3	CV-*DCCH*		Integer(-127..127)	meters
>Delta RRC3	CV-*DCCH*		Real(-0.224..0.224 by step of 0.032)	meters/sec

Condition	Explanation
Status/Health	This IE is mandatory present if "status" is not equal to "no data" or "invalid data", otherwise the IE is not needed.
DCCH	This IE is mandatory present if the IE " UE positioning GPS DGPS corrections" it is included in the point-to-point message. It is optional if the IE "UE positioning GPS DGPS corrections" is included in the broadcast message. Otherwise it is not needed.

10.3.7.91a UE positioning GPS Ephemeris and Clock Correction parameters

This IE contains information for GPS ephemeris and clock correction.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
C/A or P on L2	MP		Bit string(2)	Code(s) on L2 Channel [12]
URA Index	MP		Bit string(4)	User Range Accuracy [12]
SV Health	MP		Bit string(6)	[12]
IODC	MP		Bit string(10)	Issue of Data, Clock [12]
L2 P Data Flag	MP		Bit string(1)	[12]
SF 1 Reserved	MP		Bit string(87)	[12]
T_{GD}	MP		Bit string(8)	Estimated group delay differential [12]
t_{oc}	MP		Bit string(16)	apparent clock correction [12]
af_2	MP		Bit string(8)	apparent clock correction [12]
af_1	MP		Bit string(16)	apparent clock correction [12]
af_0	MP		Bit string(22)	apparent clock correction [12]
C_{rs}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term to the Orbit Radius (meters) [12]
Δn	MP		Bit string(16)	Mean Motion Difference From Computed Value (semi-circles/sec) [12]
M_0	MP		Bit string(32)	Mean Anomaly at Reference Time (semi-circles) [12]
C_{uc}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term To The Argument Of Latitude (radians) [12]
e	MP		Bit string(32)	c
C_{us}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term To The Argument Of Latitude (radians) [12]
$(A)^{1/2}$	MP		Bit string(32)	Semi-Major Axis (meters)$^{1/2}$ [12]
t_{oe}	MP		Bit string(16)	Reference Time Ephemeris [12]
Fit Interval Flag	MP		Bit string(1)	[12]
AODO	MP		Bit string(5)	Age Of Data Offset [12]
C_{ic}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term To The Angle Of Inclination (radians) [12]
$OMEGA_0$	MP		Bit string(32)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) [12]
C_{is}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term To The Angle Of Inclination (radians) [12]
i_0	MP		Bit string(32)	Inclination Angle at Reference Time (semi-circles) [12]
C_{rc}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius (meters) [12]
ω	MP		Bit string(32)	Argument of Perigee (semi-circles) [12]
OMEGAdot	MP		Bit string(24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles/sec) [12]
Idot	MP		Bit string(14)	Rate of Inclination Angle (semi-circles/sec) [12]

10.3.7.92 UE positioning GPS ionospheric model

The IE contains fields needed to model the propagation delays of the GPS signals through the ionosphere.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
α_0	MP		Bit string(8)	Note 1
α_1	MP		Bit string(8)	Note 1
α_2	MP		Bit string(8)	Note 1
α_3	MP		Bit string(8)	Note 1
β_0	MP		Bit string(8)	Note 2
β_1	MP		Bit string(8)	Note 2
β_2	MP		Bit string(8)	Note 2
β_3	MP		Bit string(8)	Note 2

NOTE 1: The parameters αn are the coefficients of a cubic equation representing the amplitude of the vertical delay [12].

NOTE 2: The parameters βn are the coefficients of a cubic equation representing the period of the ionospheric model [12].

10.3.7.93 UE positioning GPS measured results

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN reference time				
>>UE GPS timing of cell frames	MP		Integer(0..3715891199 9999	GPS Time of Week in units of 1/16th UMTS chips according to [19]
>>CHOICE *mode*	MP~~OP~~			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>Reference SFN	MP~~OP~~		Integer(0..4095)	The SFN for which the location is valid. If UE GPS timing of cell frames is included this is also the SFN which is time stamped
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). This time is the GPS TOW measured by the UE. ~~If the Reference SFN field is present it is the ms flank closest to the beginning of that frame. GPS Time of Week in microseconds = 1000 * GPS TOW msec + GPS TOW rem usec~~
~~UE GPS timing of cell frames TOW rem usec~~	~~OP~~		~~Integer(0..3715891199 999961439999)~~	~~GPS Time of Week intiming of cell frames in steps of units of 1/16th chipsUMTS chip MOD 61440 (where 61440 = 3840 * 16). microseconds MOD 1000.~~
Measurement Parameters	MP	1 to <maxSat>		
>Satellite ID	MP		Enumerated(0..63)	
>C/N_o	MP		Integer(0..63)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in unites of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).
>Doppler	MP		Integer(-32768..32768)	Hz, scale factor 0.2.
>Whole GPS Chips	MP		Integer(0..1022~~3~~)	Unit in GPS chips
>Fractional GPS Chips	MP		Integer(0..(2^{10}-1))	Scale factor 2^{-10}
>Multipath Indicator	MP		Enumerated(NM, low, medium, high)	See note 1
>Pseudorange RMS Error	MP		Enumerated(range index 0..range index 63)	See note 2

NOTE 1: The following table gives the mapping of the multipath indicator field.

Value	Multipath Indication
NM	Not measured
Low	MP error < 5m
Medium	5m < MP error < 43m
High	MP error > 43m

NOTE 2: The following table gives the bitmapping of the Pseudorange RMS Error field.

Range Index	Mantissa	Exponent	Floating-Point value, x_i	Pseudorange value, P
0	000	000	0.5	P < 0.5
1	001	000	0.5625	0.5 <= P < 0.5625
I	X	Y	$0.5 * (1 + x/8) * 2^y$	x_{i-1} <= P < x_i
62	110	111	112	104 <= P < 112
63	111	111	--	112 <= P

10.3.7.94 UE positioning GPS navigation model

This IE contain information required to manage the transfer of precise navigation data to the GPS-capable UE.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	Satellite ID
>Satellite Status	MP		Enumerated(NS_NN, ES_SN, ES_NN, REVD)	See note 1
>GPS Ephemeris and Clock Correction parameters	CV-*Satellite status*		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	

NOTE 1: The UE shall interpret enumerated symbols as follows.

Value	Indication
NS_NN	New satellite, new Navigation Model
ES_SN	Existing satellite, same Navigation Model
ES_NN	Existing satellite, new Navigation Model
REVD	Reserved

Condition	Explanation
Satellite status	The IE is not needed if the IE "Satellite status" is ES_SN and mandatory present otherwise.

10.3.7.95 UE positioning GPS real-time integrity

This IE contains parameters that describe the real-time status of the GPS constellation.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Satellite information	MP	1 to <maxSat>		
>BadSatID	MP		Enumerated(0..63)	

10.3.7.95a UE positioning GPS reference cell info

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell ~~and channel ID~~parameters ID	MP		Cell parameters id 10.3.6.9~~Cell and Channel Identity info 10.3.6.8a~~	

10.3.7.96 UE positioning GPS reference time

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Week	MP		Integer(0..1023)	
CHOICE *Reference Time*	MP			
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
>UTRAN GPS reference time	OP			
>>UTRAN GPS timing of cell framesTOW rem usec	MPOP		Integer(0..2322431999999371589119999996143999999)	UTRAN GPS Time of Weektiming of cell frames in stepsunits of 1/16th chipsUMTS chip MOD 61440 (where 61440 = 3840 * 16) microseconds MOD 1000. GPS Time of Week in units of 1/16th UMTS chip microseconds = 1000(3840 * 16 * GPS TOW msec) + (GPS TOW rem) usec
>>CHOICE *mode*	OP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>SFN	MPOP		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames TOW time stamps. SFN and GPS TOW msec and GPS TOW rem usec are included if relation GPS TOW/SFN is known to at least 10 µs.
>>SFN-TOW Uncertainty	OP		Enumerated (lessThan10, moreThan10)	This field indicates the uncertainty of the relation GPS TOW/SFN. lessThan10 means the relation is accurate to at least 10 ms.
>>Node B Clock DriftT$_{UTRAN-GPS}$ drift rate	OP		Real(-0.09375..0.09375 by step of 0.0125Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)	in 1/256usecchips per /sec (ppm)
>GPS reference time only				
>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
GPS TOW Assist	OP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	
>TLM Message	MP		Bit string(14)	
>TLM Reserved	MP		Bit string(2)	
>Alert	MP		Boolean	
>Anti-Spoof	MP		Boolean	

10.3.7.97 UE positioning GPS UTC model

The UTC Model field contains a set of parameters needed to relate GPS time to Universal Time Coordinate (UTC).

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
A_1	MP		Bit string(24)	sec/sec [12]
A_0	MP		Bit string(32)	seconds [12]
t_{ot}	MP		Bit string(8)	seconds [12]
WN_t	MP		Bit string(8)	weeks [12]
Δt_{LS}	MP		Bit string(8)	seconds [12]
WN_{LSF}	MP		Bit string(8)	weeks [12]
DN	MP		Bit string(8)	days [12]
Δt_{LSF}	MP		Bit string(8)	seconds [12]

10.3.7.98 UE positioning IPDL parameters

This IE contains parameters for the IPDL mode. The use of this parameters is described in [29].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
IP spacing	MP		Integer(5,7,10,15,20,30,40,50)	See [29]
IP length	MP		Integer(5,10)	See [29]
IP offset	MP		Integer(0..9)	Relates the BFN and SFN, should be same as T_cell defined in [10]; See [29]
Seed	MP		Integer(0..63)	See [29]
Burst mode parameters	OP			
>Burst Start	MP		Integer(0..15)	See [29]
>Burst Length	MP		Integer(10..25)	See [29]
>Burst freq	MP		Integer(1..16)	See [29]

10.3.7.99 UE positioning measured results

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE positioning OTDOA measured results	OP		UE positioning OTDOA measured results 10.3.7.105	~~This IE shall be not included~~
~~UE positioning OTDOA measured results extension~~	~~OP~~		~~UE positioning OTDOA measured results extension 10.3.7.105a~~	
UE positioning Position estimate info	OP		UE positioning Position estimate info 10.3.7.109	
UE positioning GPS measured results	OP		UE positioning GPS measured results 10.3.7.93	
UE positioning error	OP		UE positioning error 10.3.7.87	Included if UE positioning error occurred

10.3.7.100 UE positioning measurement

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE positioning reporting quantity	OP~~MP~~		UE positioning reporting quantity 10.3.7.111	
Measurement validity	OP		Measurement validity 10.3.7.51	
CHOICE *reporting criteria*	OP~~MP~~			
>UE positioning reporting criteria			UE positioning reporting criteria 10.3.7.110	
>Periodical reporting criteria			Periodical reporting criteria 10.3.7.53	
>No reporting				(no data) Chosen when this measurement only is used as additional measurement to another measurement
~~CHOICE *PositioningMode*~~	~~OP~~			
~~>UE-assisted~~				
~~>~~>UE positioning OTDOA assistance data for UE-assisted	~~M~~OP~~CV-OTDOA~~		UE positioning OTDOA assistance data 10.3.7.103	
~~>UE-based~~				
~~>~~>UE positioning OTDOA assistance data for UE-based	~~M~~OP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	
UE positioning GPS assistance data	OP		UE positioning GPS assistance data 10.3.7.90	

~~Condition~~	~~Explanation~~
~~*OTDOA*~~	~~This IE is mandatory present if the IE "Positioning method" is set to "OTDOA" or "OTDOA or GPS" and not needed otherwise.~~

10.3.7.101 UE positioning measurement event results

This IE contains the measurement event results that are reported to UTRAN for UE positioning measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Event ID*	MP			
>7a				
>>UE positioning Position estimate info	MP		UE positioning Position estimate info 10.3.7.109	
>7b				
>>UE positioning OTDOA measured results~~ment~~	MP		UE positioning OTDOA measured results~~ment extension~~ 10.3.7.105~~a~~	
>7c				
>>UE positioning GPS measurement	MP		UE positioning GPS measured results~~ment~~ 10.3.7.93	

10.3.7.102 Void

10.3.7.103 UE positioning OTDOA assistance data for UE-assisted

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info for UE-assisted	OP		UE positioning OTDOA reference cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list for UE-assisted	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-assisted	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	

10.3.7.103a UE positioning OTDOA assistance data for UE-based

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info for UE-based	OP		UE positioning OTDOA reference cell info for UE-based 10.3.7.108a	
UE positioning OTDOA neighbour cell list for UE-based	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-based	MP		UE positioning OTDOA neighbour cell info for UE-based 10.3.7.106a	

10.3.7.104 Void

10.3.7.105 UE positioning OTDOA measurem d results~~nt~~

~~The purpose of the OTDOA Measurement Information element is to provide OTDOA measurements of signals sent from the reference and neighbour cells.~~ This IE shall not be included.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	MP		Integer(0..4095)	SFN during which the last measurement was performed
CHOICE *mode*				
>FDD				
>>Reference cell id	MP		Primary CPICH info 10.3.6.60	
>>UE Rx-Tx time difference type 2 info	MP			
>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the reference cell.
>TDD				(no data)
>>Reference cell id	MP		Cell parameters ID 10.3.6.9	
Neighbours	MP	0 to <maxCellMeas>		
>CHOICE *mode*	MP			
>>FDD				
>>>Neighbour Identity	MD		Primary CPICH info 10.3.6.60	Default value is the same as in the first set of multiple sets.
>>>Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
>>>UE Rx-Tx time difference type 2 info	OP			Included if the neighbour is in the active set
>>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the neighbour cell.
>>TDD				
>>>Cell and Channel ID	MD		Cell and Channel Identity info 10.3.6.8a	Default value is the same as in the first set of multiple sets.
>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the SFN-SFN observed time difference type 2 measurement from the neighbour cell.
>SFN-SFN observed time difference type 2	MP		SFN-SFN observed time difference 10.3.7.63	Gives the timing relative to the reference cell. Only type 2 is allowed.

~~10.3.7.105a UE positioning OTDOA measured results extension~~

~~The purpose of the OTDOA Measurement Information element is to provide OTDOA measurements of signals sent from the reference and neighbour cells.~~

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	MP		Integer(0..4095)	SFN during which the last measurement was performed
CHOICE *mode*				
>FDD				
>>Reference cell id	MP		Primary CPICH info 10.3.6.60	
>>UE Rx-Tx time difference type 2 info	OP			
>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the reference cell.
>TDD				(no data)
>>Reference cell id	MP		Cell parameters ID 10.3.6.9	
Neighbours	MP	0 to <maxCellMeas>		
>CHOICE *mode*	MP			
>>FDD				
>>>Neighbour Identity	MP		Primary CPICH info 10.3.6.60	
>>>Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
>>>UE Rx-Tx time difference type 2 info	OP			Included if the neighbour is in the active set
>>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the neighbour cell.
>>TDD				
>>>Cell and Channel ID	MD		Cell and Channel Identity info 10.3.6.8a	Default value is the same as in the first set of multiple sets.
>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the SFN-SFN observed time difference type 2 measurement from the neighbour cell.
>SFN-SFN observed time difference type 2	MP		SFN-SFN observed time difference 10.3.7.63	Gives the timing relative to the reference cell. Only type 2 is allowed.

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window.~~, as well as the cell locations and fine cell timing for UE based OTDOA.~~

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-*IPDLs*		UE positioning IPDL parameters 10.3.7.98	
SFN offset	CV-*IPDLs*		Integer (0 .. 4095)	Define Tref as the time of beginning of system frame number SFNref of the reference cell. Define Tnc as the beginning of a frame from the neighbour cell occurring immediately after the time Tref. Let the corresponding system frame number be SFNnc. Then SFNnc = SFNref-SFN offset modulo 4096.
SFN-SFN relative time difference	MP		Integer(0.. 38399)	Gives the relative timing compared to the reference cell Equal to (Tnc-Tref)/(3.84*10^6) ⌋ where ⌊()⌋ denotes rounding to the nearest lower integer. in chips.
SFN-SFN drift	OP		Integer~~Real~~ (0, -1, -2, -3, -4, -5, -8, -10, -15, -25, -35, -50, -65, -80, -100, 1, 2, 3, 4, 5, 8, 10, 15, 25, 35, 50, 65, 80, 100) ~~(0,+0.33,+0.66,+1,+1.33,+1.66,+2,+2.5,+3,+4,+5,+7,+9,+11,+13,+15,-0.33,-0.66,-1,-1.33,-1.66,-2,-2.5,-3,-4,-5,-7,-9,-11,-13,-15)~~	~~meters~~in 1/256 chips per~~/~~second
Search Window Size	MP		Integer(20, 40, 80, 160, 320, 640, 1280, infinity)	in chips. If the value is X then the expected SFN-SFN observed time difference is in the range [RTD-X, RTD+X] where RTD is the value of the field SFN-SFN relative time difference. Infinity means that the

				uncertainty is larger than 1280 chips.
CHOICE *PositioningMode*	MP			
>UE based				(no data)
~~>>Cell Position~~	~~MD~~			~~Default is the same as previous cell~~
~~>>>Relative North~~	~~OP~~		~~Integer(-20000..20000)~~	~~Seconds, scale factor 0.03. Relative position compared to reference cell.~~
~~>>>Relative East~~	~~OP~~		~~Integer(-20000..20000)~~	~~Seconds, scale factor 0.03. Relative position compared to reference cell.~~
~~>>>Relative Altitude~~	~~OP~~		~~Integer(-4000..4000)~~	~~Relative altitude in meters compared to ref. cell.~~
~~>>Fine SFN-SFN~~	~~MP~~		~~Real(0..0.9375 in steps of 0.0625)~~	~~Gives finer resolution~~
~~>>UE positioning Relative Time Difference Quality~~	~~MP~~		~~UE positioning OTDOA quality 10.3.7.109a~~	~~Quality of the relative time difference between neighbour and reference cell.~~
~~>>Round Trip Time~~	~~OP~~		~~Real(876.00 .. 2923.875) in steps of 0.0625~~	~~In chips. Included if cell is in active set.~~
>UE assisted				(no data)

Condition	Explanation
IPDLs	This IE is mandatory present if IPDLs are applied and not needed otherwise.

10.3.7.106a UE positioning OTDOA neighbour cell info for UE-based

This IE gives approximate cell timing in order to decrease the search window, as well as the cell locations and fine cell timing for UE based OTDOA.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA neighbour cell info	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	
Cell Position	MD			Default is the same as previous cell
>Relative North	OP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>Relative East	OP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>Relative Altitude	OP		Integer(-4000..4000)	Relative altitude in meters compared to ref. cell.
Fine SFN-SFN	MP		Real(0..0.9375 in steps of 0.0625)	Gives finer resolution
UE positioning Relative Time Difference Quality	MP		UE positioning OTDOA quality 10.3.7.109a	Quality of the relative time difference between neighbour and reference cell.
Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips. Included if cell is in active set.

10.3.7.107 UE positioning OTDOA quality

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Std Resolution	MP		Bit string(2)	Std Resolution field includes the resolution used in Std of OTDOA Measurements field. Encoding on two bits as follows: '00' 10 meters '01' 20 meters '10' 30 meters '11' Reserved
Number of OTDOA Measurements	MP		Bit string(3)	Number of measurements field is used together with Std of OTDOA Measurements field to define quality of a reported OTDOA measurement. The field indicates how many OTDOA measurements have been used in the UE to define the standard deviation of the measurements. Following 3 bit encoding is used: '000' 0-4 '001' 5-9 '010' 10-14 '011' 15-24 '100' 25-34 '101' 35-44 '110' 45-54 '111' 55 or more
Std of OTDOA Measurements	MP		Bit string(5)	Std of OTDOA Measurements field includes standard deviation of OTDOA measurements. Following linear 5 bit encoding is used: '00000' 0 - (R*1-1) meters '00001' R*1 – (R*2-1) meters '00010' R*2 – (R*3-1) meters … '11111' R*31 meters or more where R is the resolution defined by Std Resolution field. E.g. R=20 m corresponds to 0-19 m, 20-39 m,…,620+ m.

10.3.7.108 UE positioning OTDOA reference cell info

This IE defines the cell used for time references in all OTDOA measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	OP		Integer (0..4095)	Time stamp (SFN of Reference Cell) of the SFN-SFN relative time differences and SFN-SFN drift rates. Included if any SFN-SFN drift value is included in IE UE positioning OTDOA neighbour cell info.
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information.This IE shall always be set to default value
CHOICE *PositioningMode*	MP			
>UE based				
~~>>CHOICE *Cell Position*~~	~~OP~~			~~The position of the antenna that defines the cell. Used for the UE based method.~~
~~>>>Ellipsoid~~				
~~>>>>Ellipsoid point~~	~~MP~~		~~Ellipsoid point 10.3.8.4a~~	
~~>>>Ellipsoid with altitude~~				
~~>>>>Ellipsoid point with altitude~~	~~MP~~		~~Ellipsoid point with altitude 10.3.8.4b~~	
~~>>Round Trip Time~~	~~OP~~		~~Real(876.00 .. 2923.875) in steps of 0.0625~~	~~In chips.~~
>UE assisted				(no data)
IPDL parameters	OP		UE positioning IPDL parameters 10.3.7.98	If this element is not included there are no idle periods present

10.3.7.108a UE positioning OTDOA reference cell info for UE-based

This IE defines the cell used for time references in all OTDOA measurements for UE-based methods.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info	MP		UE positioning OTDOA reference cell info 10.3.7.108	
CHOICE *Cell Position*	OP			The position of the antenna that defines the cell. Used for the UE based method.
>Ellipsoid				
>>Ellipsoid point	MP		Ellipsoid point 10.3.8.4a	
>Ellipsoid with altitude				
>>Ellipsoid point with altitude	MP		Ellipsoid point with altitude 10.3.8.4b	
Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips.

10.3.7.109 UE positioning position estimate info

The purpose of this IE is to provide the position estimate from the UE to the network, if the UE is capable of determining its own position.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN GPS reference time				
>>UE GPS timing of cell frames	MP		Integer(0..3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19].
>>CHOICE *mode*	MP~~OP~~			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>Reference SFN	MP~~OP~~		Integer(0..4095)	The SFN for which the location is valid and which the UTRAN GPS timing of cell frames time stamps
>GPS reference time only				
>>GPS TOW msec	MP~~OP~~		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). ~~This time stamps the beginning of the frame defined in Reference SFN~~ ~~GPS Time of Week in units of 1/16th UMTS chip microseconds = 1000(3840 * 16 * GPS TOW msec) + (GPS TOW rem) usec~~
>Cell timing				
>>SFN	MP		Integer(0..4095)	SFN during which the ~~last measurement~~position was ~~performed~~calculated.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for SFN
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies reference cell for SFN
~~GPS TOW rem usec~~	~~OP~~		~~Integer(0..61439999)~~	~~GPS Time of Week in units of 1/16th UMTS chip MOD 61440 (where 61440 = 3840 * 16) microseconds MOD 1000.~~
CHOICE *Position estimate*	MP			
>Ellipsoid Point			Ellipsoid Point; 10.3.8.4a	
>Ellipsoid point with uncertainty circle			Ellipsoid point with uncertainty circle 10.3.8.4d	
>Ellipsoid point with uncertainty ellipse			Ellipsoid point with uncertainty ellipse 10.3.8.4e	
>Ellipsoid point with altitude			Ellipsoid point with altitude 10.3.8.4b	

>Ellipsoid point with altitude and uncertainty ellipsoid			Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	

10.3.7.109a UE positioning Relative Time Difference quality

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Relative Time Difference Std Resolution	MP		Bit string(2)	Std Resolution field includes the resolution used in Std of Relative Time Difference field. Encoding on two bits as follows: '00' 10 meters '01' 20 meters '10' 30 meters '11' Reserved
Std of Relative Time Difference	MP		Bit string(5)	Std of Relative Time difference field includes standard deviation of (SFN-SFN relative time difference + Fine SFN-SFN). Following linear 5 bit encoding is used: '00000' 0 - (R*1-1) meters '00001' R*1 – (R*2-1) meters '00010' R*2 – (R*3-1) meters … '11111' R*31 meters or more where R is the resolution defined by Std Resolution field. E.g. R=20 m corresponds to 0-19 m, 20-39 m,…,620+ m.

10.3.7.110 UE positioning reporting criteria

The triggering of the event-triggered reporting for an UE positioning measurement.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Amount of reporting	MP		Integer(1, 2, 4, 8, 16, 32, 64,infinite)	
>Report first fix	MP		Boolean	If true the UE reports the position once the measurement control is received, and then each time an event is triggered.
>Measurement interval	MP		Integer(5,15,60,300,900,1800,3600,7200)	Indicates how often the UE should make the measurement In seconds
>CHOICE *Event ID*	MP			
>>7a				
>>>Threshold Position Change	MP		Integer(10,20,30,40,50,100,200,300,500,1000,2000,5000,10000,20000,50000,100000)	Indicated how much the position should change compared to last reported position fix in order to trigger the event.
>>7b				
>>>Threshold SFN-SFN change	MP		Real(0.25,0.5,1,2,3,4,5,10,20,50,100,200,500,1000,2000,5000)	Chips. Indicates how much the SFN-SFN measurement of ANY measured cell is allowed to change before the event is triggered.
>>7c				
>>>Threshold SFN-GPS TOW	MP		Integer(1,2,3,5,10,20,50,100)	Time in ms. When the GPS TOW and SFN timer has drifted apart more than the specified value the event is triggered)

10.3.7.111 UE positioning reporting quantity

The purpose of the element is to express the allowed/required location method(s), and to provide information ~~requir~~ desired QoS.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Method Type	MP		Enumerated(UE assisted, UE based, UE based is preferred but UE assisted is allowed, UE assisted is preferred but UE based is allowed)	
Positioning Methods	MP		Enumerated(OTDOA, GPS, OTDOA or GPS, Cell ID)	
Response Time	MP		Integer(1,2,4, 8, 16, 32, 64, 128)	~~in seconds~~This IE shall be ignored
Horizontal Accuracy	CV-*MethodType*		Bit string(7)	The uncertainty is derived from the "uncertainty code" k by $r = 10*(1.1^{k}-1)$
Vertical Accuracy	CV-*MethodType*		Bit string(7)	The uncertainty is derived from the "uncertainty code" k by $r = 45$~~10~~$*(1.025$~~1~~$^{k}-1)$
GPS timing of Cell wanted	MP		Boolean	If true the SRNC wants the UE to report the SFN-GPS timing of the reference cell. This is however optional in the UE.
Multiple Sets	MP		Boolean	~~TRUE indicates that the UE is requested to send multiple *OTDOA/GPS Measurement Information Sets*. UE is expected to include the current measurement set.~~ This IE shall be ignored.
Additional Assistance Data Request	MP		Boolean	TRUE indicates that the UE is requested to send the IE "Additional assistance Data Request" when the IE "UE positioning Error" is present in the UE positioning measured results.
Environment Characterisation	OP		Enumerated(possibly heavy multipath and NLOS conditions, no or light multipath and usually LOS conditions, not defined or mixed environment)	

Condition	Explanation
Method Type	The IE is optional if the IE "Method Type" is "UE assisted"; otherwise it is mandatory present.

10.3.8.21 SIB type

The SIB type identifies a specific system information block.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB type	MP		Enumerated, see below	

The list of values to encode is:

Master information block,

System Information Type 1,

System Information Type 2,

System Information Type 3,

System Information Type 4,

System Information Type 5,

System Information Type 6,

System Information Type 7,

System Information Type 8,

System Information Type 9,

System Information Type 10,

System Information Type 11,

System Information Type 12,

System Information Type 13,

System Information Type 13.1,

System Information Type 13.2,

System Information Type 13.3,

System Information Type 13.4,

System Information Type 14,

System Information Type 15,

System Information Type 15.1,

System Information Type 15.2,

System Information Type 15.3,

System Information Type 15.4,

System Information Type 15.5,

System Information Type 16,

System Information Type 17,

System Information Type 18,

Scheduling Block 1,

Scheduling Block 2.

In addition, at least one spare value, criticality: ignore, is needed.

10.3.8.22 SIB type SIBs only

The SIB type identifies a specific system information block.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB type SIBs only	MP		Enumerated, see below	

The list of values to encode is:

System Information Type 1,

System Information Type 2,

System Information Type 3,

System Information Type 4,

System Information Type 5,

System Information Type 6,

System Information Type 7,

System Information Type 8,

System Information Type 9,

System Information Type 10,

System Information Type 11,

System Information Type 12,

System Information Type 13,

System Information Type 13.1,

System Information Type 13.2,

System Information Type 13.3,

System Information Type 13.4,

System Information Type 14,

System Information Type 15,

System Information Type 15.1,

System Information Type 15.2,

System Information Type 15.3,

System Information Type 15.4,

System Information Type 15.5,

System Information Type 16,

System Information Type 17,

System Information Type 18.

In addition, at least one spare value, criticality: ignore, is needed.

11.2 PDU definitions

```
...
-- **************************************************
--
-- Assistance Data Delivery
--
-- **************************************************

AssistanceDataDelivery ::= CHOICE {
    r3                              SEQUENCE {
        assistanceDataDelivery-r3       AssistanceDataDelivery-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

AssistanceDataDelivery-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
    rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Measurement Information Elements
    ue-positioning-GPS-AssistanceData           UE-Positioning-GPS-AssistanceData
    OPTIONAL,
ue-positioning-OTDOA-AssistanceData -UEB    UE-Positioning-OTDOA-AssistanceData -UEB        OPTIONAL
}

...

-- **************************************************
--
-- MEASUREMENT CONTROL
--
-- **************************************************

MeasurementControl ::= CHOICE {
    r3                              SEQUENCE {
        measurementControl-r3           MeasurementControl-r3-IEs,
        v390nonCriticalExtensions           SEQUENCE {
            measurementControl-v390ext      MeasurementControl-v390ext,
            nonCriticalExtensions           SEQUENCE{}                      OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

MeasurementControl-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Measurement IEs
        measurementIdentity     MeasurementIdentity,
        measurementCommand              MeasurementCommand,
        -- TABULAR: The measurement type is included in MeasurementCommand.
        measurementReportingMode        MeasurementReportingMode            OPTIONAL,
        additionalMeasurementList       AdditionalMeasurementID-List        OPTIONAL,
    -- Physical channel IEs
        dpch-CompressedModeStatusInfo   DPCH-CompressedModeStatusInfo       OPTIONAL
}

MeasurementControl-v390ext ::= SEQUENCE {
        ue-Positioning-Measurement-v390ext      UE-Positioning-Measurement-v390ext  OPTIONAL
}
```

```
...

-- **************************************************
--
-- MEASUREMENT REPORT
--
-- **************************************************

MeasurementReport ::= SEQUENCE {
    -- Measurement IEs
        measurementIdentity     MeasurementIdentity,
        measuredResults                 MeasuredResults                     OPTIONAL,
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
        additionalMeasuredResults       MeasuredResultsList                 OPTIONAL,
        eventResults                    EventResults                        OPTIONAL,
    -- Extension mechanism for non- release99 information
        v390nonCriticalExtensions           SEQUENCE {
            measurementReport-v390ext       MeasurementReport-v390ext,
            nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
        }       OPTIONAL
}

MeasurementReport-v390ext ::= SEQUENCE{
        measuredResults-v390ext         MeasuredResults-v390ext             OPTIONAL,
}
```

11.3 Information element definitions

```
-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************

UE-Positioning-Capability ::=                   SEQUENCE {
    standaloneLocMethodsSupported       BOOLEAN,
    ue-BasedOTDOA-Supported             BOOLEAN,
    networkAssistedGPS-Supported        NetworkAssistedGPS-Supported,
    gps-ReferenceTimeCapablesSupportForUE-GPS-TimingOfCellFrames            BOOLEAN,
    supportForIPDL                      BOOLEAN
}
...

-- **************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- **************************************************

EventResults ::=                    CHOICE {
    intraFreqEventResults               IntraFreqEventResults,
    interFreqEventResults               InterFreqEventResults,
    interRATEventResults                InterRATEventResults,
    trafficVolumeEventResults           TrafficVolumeEventResults,
    qualityEventResults                 QualityEventResults,
    ue-InternalEventResults             UE-InternalEventResults,
    ue-positioning-MeasurementEventResults          UE-Positioning-MeasurementEventResults
}



...

GPS-TOW-1msec ::=                   INTEGER (0..604799999)

GPS-TOW-Assist ::=                  SEQUENCE {
    satID                               SatID,
    tlm-Message                         BIT STRING (SIZE (14)),
    tlm-Reserved                        BIT STRING (SIZE (2)),
    alert                               BOOLEAN,
    antiSpoof                           BOOLEAN
}
```

```
GPS-TOW-AssistList ::=              SEQUENCE (SIZE (1..maxSat)) OF
                                        GPS-TOW-Assist

GPS-TOW-rem-usec ::=                INTEGER (0..999)


MeasuredResults ::=                 CHOICE {
    intraFreqMeasuredResultsList        IntraFreqMeasuredResultsList,
    interFreqMeasuredResultsList        InterFreqMeasuredResultsList,
    interRATMeasuredResultsList     InterRATMeasuredResultsList,
    trafficVolumeMeasuredResultsList    TrafficVolumeMeasuredResultsList,
    qualityMeasuredResults              QualityMeasuredResults,
    ue-InternalMeasuredResults          UE-InternalMeasuredResults,
    ue-positioning-MeasuredResults                  UE-Positioning-MeasuredResults
}

MeasuredResults-v390ext ::=                 SEQUENCE {
    ue-positioning-MeasuredResults-v390ext                  UE-Positioning-MeasuredResults-v390ext
}


Neighbour ::=                       SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            neighbourIdentity                   PrimaryCPICH-Info                   OPTIONAL,
            uE-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info    OPTIONAL
        },
        tdd                             SEQUENCE {
            neighbourAndChannelIdentity     CellAndChannelIdentity              OPTIONAL
        }
    },
    neighbourQuality                    NeighbourQuality,
    sfn-SFN-ObsTimeDifference2          SFN-SFN-ObsTimeDifference2
}

NeighbourList ::=                   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        Neighbour

Neighbour-v390ext ::=                       SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            frequencyInfo                       FrequencyInfo
        },
        tdd                             NULL
    }
            neighbourIdentity                   PrimaryCPICH-Info                   OPTIONAL,
            frequencyInfo                       FrequencyInfo                       OPTIONAL,
            uE-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info    OPTIONAL
        },
        tdd                             SEQUENCE {
            neighbourAndChannelIdentity     CellAndChannelIdentity              OPTIONAL
        }
    },
    neighbourQuality                    NeighbourQuality,
    sfn-SFN-ObsTimeDifference2          SFN-SFN-ObsTimeDifference2
}

NeighbourList-v390ext ::=                   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        Neighbour-v390ext
-- The order of the cells in IE NeighbourList-v390ext shall be the
-- same as the order in IE NeighbourList

-- Actual value = IE value * 0.0125 - 0.09375
NodeB-ClockDrift ::=                INTEGER (0..15)

SFN-SFN-Drift ::=                   ENUMERATED {
                                    sfnsfndrift0, sfnsfndrift1, sfnsfndrift2, sfnsfndrift3,
                                    sfnsfndrift4, sfnsfndrift5, sfnsfndrift8, sfnsfndrift10,
                                    sfnsfndrift15, sfnsfndrift25, sfnsfndrift35, sfnsfndrift50,
                                    sfnsfndrift65, sfnsfndrift80, sfnsfndrift100, sfnsfndrift-1,
                                    sfnsfndrift-2, sfnsfndrift-3, sfnsfndrift-4, sfnsfndrift-5,
                                    sfnsfndrift-8, sfnsfndrift-10, sfnsfndrift-15, sfnsfndrift-25,
                                    sfnsfndrift-35, sfnsfndrift-50, sfnsfndrift-65, sfnsfndrift-80,
                                    sfnsfndrift-100no-drift, sfnsfndrift0-33, sfnsfndrift0-66,
                                        sfnsfndrift1, sfnsfndrift1-33, sfnsfndrift1-66,
                                        sfnsfndrift2, sfnsfndrift2-5, sfnsfndrift3,
                                        sfnsfndrift4, sfnsfndrift5, sfnsfndrift7,
                                        sfnsfndrift9, sfnsfndrift11, sfnsfndrift13,
```

```
                                        sfnsfndrift15, sfnsfndrift-0-33, sfnsfndrift-0-66,
                                        sfnsfndrift-1, sfnsfndrift-1-33, sfnsfndrift-1-66,
                                        sfnsfndrift-2, sfnsfndrift-2-5, sfnsfndrift-3,
                                        sfnsfndrift-4, sfnsfndrift-5, sfnsfndrift-7,
                                        sfnsfndrift-9, sfnsfndrift-11, sfnsfndrift-13,
                                        sfnsfndrift-15 }


UE-Positioning-Accuracy ::=                 BIT STRING (SIZE (7))


UE-Positioning-CipherParameters ::=         SEQUENCE {
    cipheringKeyFlag                    BIT STRING (SIZE (1)),
    cipheringSerialNumber               INTEGER (0..65535)
}

UE-Positioning-Error ::=                        SEQUENCE {
    errorReason                         UE-Positioning-ErrorCause,
    ue-positioning-GPS-additionalAssistanceDataRequest          UE-Positioning-GPS-
AdditionalAssistanceDataRequest OPTIONAL
}

UE-Positioning-ErrorCause ::=                   ENUMERATED {
                                        notEnoughOTDOA-Cells,
                                        notEnoughGPS-Satellites,
                                        assistanceDataMissing,
                                        methodNotSupported,
                                        undefinedError,
                                        requestDeniedByUser,
                                        notProcessedAndTimeout,
                                        referenceCellNotServingCell }

UE-Positioning-EventParam ::=               SEQUENCE {
    reportingAmount                     ReportingAmount,
    reportFirstFix                      BOOLEAN,
    measurementInterval                 UE-Positioning-MeasurementInterval,
    eventSpecificInfo                   UE-Positioning-EventSpecificInfo
}

UE-Positioning-EventParamList ::=               SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        UE-Positioning-EventParam

UE-Positioning-EventSpecificInfo ::=            CHOICE {
    e7a                                 ThresholdPositionChange,
    e7b                                 ThresholdSFN-SFN-Change,
    e7c                                 ThresholdSFN-GPS-TOW
}

UE-Positioning-GPS-AcquisitionAssistance ::=    SEQUENCE {
    gps-ReferenceTime               INTEGER (0..604799999),
    utran-GPSReferenceTime              UTRAN-GPSReferenceTime          OPTIONAL,
    referenceTime                       CHOICE {
        utran-ReferenceTime                 UTRAN-ReferenceTime,
        gps-ReferenceTimeOnly               INTEGER (0..604799999)
    },
    satelliteInformationList            AcquisitionSatInfoList
}

UE-Positioning-GPS-AdditionalAssistanceDataRequest ::=      SEQUENCE {
    almanacRequest                      BOOLEAN,
    utcModelRequest                     BOOLEAN,
    ionosphericModelRequest             BOOLEAN,
    navigationModelRequest              BOOLEAN,
    dgpsCorrectionsRequest              BOOLEAN,
    referenceLocationRequest            BOOLEAN,
    referenceTimeRequest                BOOLEAN,
    aquisitionAssistanceRequest         BOOLEAN,
    realTimeIntegrityRequest            BOOLEAN,
    navModelAddDataRequest              UE-Positioning-GPS-NavModelAddDataReq       OPTIONAL
}

UE-Positioning-GPS-Almanac ::=                  SEQUENCE {
    wn-a                                BIT STRING (SIZE (8)),
    almanacSatInfoList                  AlmanacSatInfoList,
    sv-GlobalHealth                     BIT STRING (SIZE (364))             OPTIONAL
}
```

```
UE-Positioning-GPS-AssistanceData ::=           SEQUENCE {
    ue-positioning-GPS-ReferenceTime                UE-Positioning-GPS-ReferenceTime
    OPTIONAL,
    ue-positioning-GPS-ReferenceLocation            ReferenceLocation               OPTIONAL,
    ue-positioning-GPS-DGPS-Corrections             UE-Positioning-GPS-DGPS-Corrections
    OPTIONAL,
    ue-positioning-GPS-NavigationModel              UE-Positioning-GPS-NavigationModel
    OPTIONAL,
    ue-positioning-GPS-IonosphericModel             UE-Positioning-GPS-IonosphericModel
    OPTIONAL,
    ue-positioning-GPS-UTC-Model                    UE-Positioning-GPS-UTC-Model
    OPTIONAL,
    ue-positioning-GPS-Almanac                      UE-Positioning-GPS-Almanac
    OPTIONAL,
    ue-positioning-GPS-AcquisitionAssistance        UE-Positioning-GPS-AcquisitionAssistance
    OPTIONAL,
    ue-positioning-GPS-Real-timeIntegrity           BadSatList                              OPTIONAL
    ue-positioning-GPS-referenceCellInfo            UE-Positioning-GPS-rReferenceCellInfo
    OPTIONAL
}

UE-Positioning-GPS-DGPS-Corrections ::=     SEQUENCE {
    gps-TOW                             INTEGER (0..604799),
    statusHealth                        DiffCorrectionStatus,
    dgps-CorrectionSatInfoList          DGPS-CorrectionSatInfoList
}

UE-Positioning-GPS-IonosphericModel ::=     SEQUENCE {
    alfa0                               BIT STRING (SIZE (8)),
    alfa1                               BIT STRING (SIZE (8)),
    alfa2                               BIT STRING (SIZE (8)),
    alfa3                               BIT STRING (SIZE (8)),
    beta0                               BIT STRING (SIZE (8)),
    beta1                               BIT STRING (SIZE (8)),
    beta2                               BIT STRING (SIZE (8)),
    beta3                               BIT STRING (SIZE (8))
}

UE-Positioning-GPS-MeasurementResults ::=               SEQUENCE {
    referenceTime                       CHOICE {
        utran-GPSReferenceTimeResult            UTRAN-GPSReferenceTimeResult,
        gps-ReferenceTimeOnly                   INTEGER (0..604799999)
    },
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity               CellParametersID
        }
    }                                                                           OPTIONAL,
    referenceSFN                        ReferenceSFN                            OPTIONAL,
    gps-TOW-1msec                       GPS-TOW-1msec,
    gps-TOW-rem-usec                    GPS-TOW-rem-usec                        OPTIONAL,
    gps-MeasurementParamList            GPS-MeasurementParamList
}

UE-Positioning-GPS-NavigationModel ::=          SEQUENCE {
    navigationModelSatInfoList          NavigationModelSatInfoList
}

UE-Positioning-GPS-NavModelAddDataReq ::=       SEQUENCE {
    gps-Week                            INTEGER (0..1023),
    gps-Toe                             INTEGER (0..167),
    tToeLimit                           INTEGER (0..10),
    satDataList                         SatDataList
}

UE-Positioning-GPS-RreferenceCellInfo ::=       SEQUENCE{
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity               CellParametersID
        }
}
```

```
UE-Positioning-GPS-ReferenceTime ::=            SEQUENCE {
    gps-Week                            INTEGER (0..1023),
    gps-tow-1msec                       GPS-TOW-1msec,
    gps-tow-rem-usec                    GPS-TOW-rem-usec                    OPTIONAL,
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity               CellParametersID
        }
    }                                                                       OPTIONAL,
    sfn                                 INTEGER (0..4095)                   OPTIONAL,
    utran-GPSReferenceTime              UTRAN-GPSReferenceTime              OPTIONAL,
    sfn-tow-Uncertainty                 SFN-TOW-Uncertainty                 OPTIONAL,
    utran-GPS-DriftRatenodeBClockDrift                      UTRAN-GPS-DriftRateNodeB-ClockDrift
            OPTIONAL,
    gps-TOW-AssistList                  GPS-TOW-AssistList                  OPTIONAL
}

UE-Positioning-GPS-UTC-Model ::=                SEQUENCE {
    a1                                  BIT STRING (SIZE (24)),
    a0                                  BIT STRING (SIZE (32)),
    t-ot                                BIT STRING (SIZE (8)),
    wn-t                                BIT STRING (SIZE (8)),
    delta-t-LS                          BIT STRING (SIZE (8)),
    wn-lsf                              BIT STRING (SIZE (8)),
    dn                                  BIT STRING (SIZE (8)),
    delta-t-LSF                         BIT STRING (SIZE (8))
}

UE-Positioning-IPDL-Parameters ::=              SEQUENCE {
    ip-Spacing                          IP-Spacing,
    ip-Length                           IP-Length,
    ip-Offset                           INTEGER (0..9),
    seed                                INTEGER (0..63),
    burstModeParameters                 BurstModeParameters     OPTIONAL
}

UE-Positioning-MeasuredResults ::=              SEQUENCE {
-- This IE is not used in this version of the specification and shall not be included.
-- IE "dummy" should be removed in later versions of the message including this IE
    ue-positioning-OTDOA-Measurement                UE-Positioning-OTDOA-Measurement
    OPTIONAL,
    ue-positioning-PositionEstimateInfo             UE-Positioning-PositionEstimateInfo
        OPTIONAL,
    ue-positioning-GPS-Measurement                  UE-Positioning-GPS-MeasurementResults
    OPTIONAL,
    ue-positioning-Error                            UE-Positioning-Error
    OPTIONAL
}

UE-Positioning-MeasuredResults-v390ext ::=              SEQUENCE {
    ue-Positioning-OTDOA-Measurement-v390ext                UE-Positioning-OTDOA-Measurement-v390ext
}


UE-Positioning-Measurement ::=                  SEQUENCE {
    ue-positioning-ReportingQuantity                UE-Positioning-ReportingQuantity,
    reportCriteria                      UE-Positioning-ReportCriteria,
    ue-positioning-OTDOA-AssistanceData         UE-Positioning-OTDOA-AssistanceData
    OPTIONAL,
    ue-positioning-GPS-AssistanceData               UE-Positioning-GPS-AssistanceData
    OPTIONAL
}


UE-Positioning-Measurement-v390ext ::=          SEQUENCE {
    ue-positioning-ReportingQuantity-v390ext        UE-Positioning-ReportingQuantity-v390ext
    OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    ue-positioning-OTDOA-AssistanceData-UEB         UE-Positioning-OTDOA-AssistanceData-UEB
    OPTIONAL
}


UE-Positioning-MeasurementEventResults ::=      CHOICE {
    event7a                             UE-Positioning-PositionEstimateInfo,
```

```
    event7b                             UE-Positioning-OTDOA-Measurement-v390ext,
    event7c                             UE-Positioning-GPS-MeasurementResults
}

UE-Positioning-MeasurementInterval ::=          ENUMERATED {
                                        e5, e15, e60, e300,
                                        e900, e1800, e3600, e7200 }

UE-Positioning-MethodType ::=                   ENUMERATED {
                                        ue-Assisted,
                                        ue-Based,
                                        ue-BasedPreferred,
                                        ue-AssistedPreferred }

UE-Positioning-OTDOA-AssistanceData ::=     SEQUENCE {
    ue-positioning-OTDOA-ReferenceCellInfo          UE-Positioning-OTDOA-ReferenceCellInfo
    OPTIONAL,
    ue-positioning-OTDOA-NeighbourCellList              UE-Positioning-OTDOA-NeighbourCellList
        OPTIONAL
}


UE-Positioning-OTDOA-AssistanceData-UEB ::=     SEQUENCE {
    ue-positioning-OTDOA-ReferenceCellInfo-UEB          UE-Positioning-OTDOA-ReferenceCellInfo-UEB
                OPTIONAL,
    ue-positioning-OTDOA-NeighbourCellList-UEB              UE-Positioning-OTDOA-NeighbourCellList-
UEB             OPTIONAL
}

UE-Positioning-OTDOA-Measurement ::=            SEQUENCE {
    sfn                                 INTEGER (0..4095),
    modeSpecificInfo                CHOICE {
        fdd                                 SEQUENCE {
            referenceCellIDentity               PrimaryCPICH-Info,
            ue-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info
        },
        tdd                                 SEQUENCE {
            referenceCellIdentity           CellParametersID
        }   },
    neighbourList                       NeighbourList                       OPTIONAL
}


UE-Positioning-OTDOA-Measurement-v390ext ::=            SEQUENCE {
    sfn                                 INTEGER (0..4095),
    modeSpecificInfo                CHOICE {
        fdd                                 SEQUENCE {
            referenceCellIDentity               PrimaryCPICH-Info,
            ue-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info    OPTIONAL
        },
        tdd                                 SEQUENCE {
            referenceCellIdentity           CellParametersID
        }   },
    neighbourList-v390ext                       NeighbourList-v390ext                       OPTIONAL
}


UE-Positioning-OTDOA-NeighbourCellInfo  ::= SEQUENCE {
    modeSpecificInfo    CHOICE  {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    ue-positioning-IPDL-Paremeters              UE-Positioning-IPDL-Parameters
    OPTIONAL,
    sfn-SFN-RelTimeDifference           SFN-SFN-RelTimeDifference1,
    sfn-SFN-Drift                       SFN-SFN-Drift       OPTIONAL,
    searchWindowSize                    OTDOA-SearchWindowSize,
    positioningMode     CHOICE{
        ueBased                                 SEQUENCE {
            relativeNorth                       INTEGER (-20000..20000)             OPTIONAL,
            relativeEast                        INTEGER (-20000..20000)             OPTIONAL,
            relativeAltitude                    INTEGER (-4000..4000)               OPTIONAL,
            fineSFN-SFN                         FineSFN-SFN,
```

```
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                   INTEGER (0.. 32766)                 OPTIONAL
        },
        ueAssisted                          SEQUENCE {}
    }
}


UE-Positioning-OTDOA-NeighbourCellInfo-UEB  ::= SEQUENCE {
    modeSpecificInfo    CHOICE  {
        fdd                             SEQUENCE {
            primaryCPICH-Info               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE{
            cellAndChannelIdentity          CellAndChannelIdentity
        }
    },
    frequencyInfo                   FrequencyInfo                       OPTIONAL,
    ue-positioning-IPDL-Paremeters              UE-Positioning-IPDL-Parameters
    OPTIONAL,
    sfn-SFN-RelTimeDifference       SFN-SFN-RelTimeDifference1,
    sfn-SFN-Drift                   SFN-SFN-Drift       OPTIONAL,
    searchWindowSize                OTDOA-SearchWindowSize,
    relativeNorth                   INTEGER (-20000..20000)             OPTIONAL,
    relativeEast                    INTEGER (-20000..20000)             OPTIONAL,
    relativeAltitude                INTEGER (-4000..4000)               OPTIONAL,
    fineSFN-SFN                     FineSFN-SFN,
    -- actual value = (IE value * 0.0625) + 876
    roundTripTime                   INTEGER (0.. 32766)                 OPTIONAL
}


UE-Positioning-OTDOA-NeighbourCellList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        UE-Positioning-OTDOA-NeighbourCellInfo


UE-Positioning-OTDOA-NeighbourCellList-UEB ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        UE-Positioning-OTDOA-NeighbourCellInfo-UEB


UE-Positioning-OTDOA-Quality ::=            SEQUENCE {
    stdResolution                   BIT STRING (SIZE (2)),
    numberOfOTDOA-Measurements      BIT STRING (SIZE (3)),
    stdOfOTDOA-Measurements         BIT STRING (SIZE (5))
}

UE-Positioning-OTDOA-ReferenceCellInfo ::=          SEQUENCE {
    sfn                             INTEGER (0..4095)
    OPTIONAL,
    modeSpecificInfo CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info               PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE{
            cellAndChannelIdentity          CellAndChannelIdentity
        }
    },
    frequencyInfo                   FrequencyInfo                       OPTIONAL,
    positioningMode CHOICE {
        ueBased                             SEQUENCE {
            cellPosition                            ReferenceCellPosition   OPTIONAL,
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                   INTEGER (0..32766)              OPTIONAL
        },
        ueAssisted                          SEQUENCE {}
    },
    ue-positioning-IPDL-Paremeters          UE-Positioning-IPDL-Parameters  OPTIONAL
}


UE-Positioning-OTDOA-ReferenceCellInfo-UEB ::=          SEQUENCE {
    sfn                             INTEGER (0..4095)
    OPTIONAL,
    modeSpecificInfo CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info               PrimaryCPICH-Info
        },
```

```
        tdd                                     SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellPosition                        ReferenceCellPosition   OPTIONAL,
    -- actual value = (IE value * 0.0625) + 876
    roundTripTime                       INTEGER (0..32766)              OPTIONAL
    ue-positioning-IPDL-Paremeters      UE-Positioning-IPDL-Parameters  OPTIONAL
}

UE-Positioning-PositionEstimateInfo ::=             SEQUENCE {
    referenceTime                       CHOICE {
        utran-GPSReferenceTimeResult            UTRAN-GPSReferenceTimeResult,
        gps-ReferenceTimeOnly               INTEGER (0..604799999),
        cell-Timing                         SEQUENCE {
            sfn                                         INTEGER (0..4095),
            modeSpecificInfo CHOICE {
                fdd                                     SEQUENCE {
                    primaryCPICH-Info                   PrimaryCPICH-Info
                },
                tdd                                     SEQUENCE{
                    cellAndChannelIdentity              CellAndChannelIdentity
                }
        }
    },
    modeSpecificInfo                CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE {
            referenceIdentity                   CellParametersID
        }
    }                                                           OPTIONAL,
    referenceSFN                        ReferenceSFN        OPTIONAL,
    gps-tow-1msec                       GPS-TOW-1msec       OPTIONAL,
    gps-tow-rem-usec                    GPS-TOW-rem-usec    OPTIONAL,
    positionEstimate                    PositionEstimate
}

UE-Positioning-ReportCriteria ::=           CHOICE {
    ue-positioning-ReportingCriteria            UE-Positioning-EventParamList,
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    noReporting                         NULL
}


UE-Positioning-ReportingQuantity ::=            SEQUENCE {
    methodType                          UE-Positioning-MethodType,
    positioningMethod                   PositioningMethod,
-- This IE is not used in this version of the specification and should be ignored.
-- IE "dummy" should be removed in later versions of the message including this IE
    dummy responseTime                          UE-Positioning-ResponseTime,
    horizontal-Aaccuracy                            UE-Positioning-Accuracy
    OPTIONAL,
    gps-TimingOfCellWanted              BOOLEAN,
    -- This IE is not used in this version of the specification and should be ignored.
-- IE "dummy" should be removed in later versions of the message including this IE
    dummymultipleSets                           BOOLEAN,
    additionalAssistanceDataRequest     BOOLEAN,
    environmentCharacterisation         EnvironmentCharacterisation         OPTIONAL
}


UE-Positioning-ReportingQuantity-v390ext ::=        SEQUENCE {
    vertical-Accuracy                   UE-Positioning-Accuracy
    OPTIONAL,
}


UE-Positioning-ResponseTime ::=             ENUMERATED {
                                        s1, s2, s4, s8, s16,
                                        s32, s64, s128 }

UTRA-CarrierRSSI ::=                INTEGER (0..76)

UTRAN-GPS-DriftRate ::=             ENUMERATED {
```

```
                                    UTRAN-GPSDrift0, UTRAN-GPSDrift1, UTRAN-GPSDrift2, UTRAN-
                                    GPSDrift5, UTRAN-GPSDrift10, UTRAN-GPSDrift15, UTRAN-GPSDrift25,
                                    UTRAN-GPSDrift50, UTRAN-GPSDrift-1, UTRAN-GPSDrift-2, UTRAN-
                                    GPSDrift-5, UTRAN-GPSDrift-10, UTRAN-GPSDrift-15, UTRAN-
                                    GPSDrift-25, UTRAN-GPSDrift-50}

UTRAN-GPSReferenceTime ::=          SEQUENCE {
    gps-tow-1msec                   GPS-TOW-1msec,
    gps-tow-rem-usec                GPS-TOW-rem-usec,
    utran-GPSTimingOfCell           INTEGER(0..2322431999999),
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info           OPTIONAL
        },
        tdd                             SEQUENCE {
            referenceIdentity       CellParametersID                    OPTIONAL
        }       OPTIONAL
    },
    sfn                                 INTEGER (0..4095)
}

UTRAN-GPSReferenceTimeResult ::=            SEQUENCE {
    ue-GPSTimingOfCell          INTEGER(0..37158911999999),
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity       CellParametersID
        }
    },
    sfn                                 INTEGER (0..4095)
}

VarianceOfRLC-BufferPayload ::=     ENUMERATED {
                                        plv0, plv4, plv8, plv16, plv32, plv64,
                                        plv128, plv256, plv512, plv1024,
                                        plv2k, plv4k, plv8k, plv16k }

-- Actual value = IE value * 0.1
W ::=                               INTEGER (0..20)

...

-- ************************************************
--
--     OTHER INFORMATION ELEMENTS (10.3.8)
--
-- ************************************************

...

SIB-Type ::=                        ENUMERATED {
                                        masterInformationBlock,
                                        systemInformationBlockType1,
                                        systemInformationBlockType2,
                                        systemInformationBlockType3,
                                        systemInformationBlockType4,
                                        systemInformationBlockType5,
                                        systemInformationBlockType6,
                                        systemInformationBlockType7,
                                        systemInformationBlockType8,
                                        systemInformationBlockType9,
                                        systemInformationBlockType10,
                                        systemInformationBlockType11,
                                        systemInformationBlockType12,
                                        systemInformationBlockType13,
                                        systemInformationBlockType13-1,
                                        systemInformationBlockType13-2,
                                        systemInformationBlockType13-3,
                                        systemInformationBlockType13-4,
                                        systemInformationBlockType14,
                                        systemInformationBlockType15,
                                        systemInformationBlockType15-1,
                                        systemInformationBlockType15-2,
                                        systemInformationBlockType15-3,
                                        systemInformationBlockType16,
                                        systemInformationBlockType17,
```

```
                                    systemInformationBlockType15-4,
                                    systemInformationBlockType18,
                                    schedulingBlock1,
                                    schedulingBlock2,
                                    systemInformationBlockType15-5,
                                    spare1, spare2, spare3 }


SIB-TypeAndTag ::=                  CHOICE {
    sysInfoType1                        PLMN-ValueTag,
    sysInfoType2                        CellValueTag,
    sysInfoType3                        CellValueTag,
    sysInfoType4                        CellValueTag,
    sysInfoType5                        CellValueTag,
    sysInfoType6                        CellValueTag,
    sysInfoType7                        NULL,
    sysInfoType8                        CellValueTag,
    sysInfoType9                        NULL,
    sysInfoType10                       NULL,
    sysInfoType11                       CellValueTag,
    sysInfoType12                       CellValueTag,
    sysInfoType13                       CellValueTag,
    sysInfoType13-1                     CellValueTag,
    sysInfoType13-2                     CellValueTag,
    sysInfoType13-3                     CellValueTag,
    sysInfoType13-4                     CellValueTag,
    sysInfoType14                       NULL,
    sysInfoType15                       CellValueTag,
    sysInfoType16                       PredefinedConfigIdentityAndValueTag,
    sysInfoType17                       NULL,
    sysInfoType15-1                     CellValueTag,
    sysInfoType15-2                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-3                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-4                     CellValueTag,
    sysInfoType18                       CellValueTag,
    sysInfoType15-5                     CellValueTag
}

SIBSb-TypeAndTag ::=                    CHOICE {
    sysInfoType1                        PLMN-ValueTag,
    sysInfoType2                        CellValueTag,
    sysInfoType3                        CellValueTag,
    sysInfoType4                        CellValueTag,
    sysInfoType5                        CellValueTag,
    sysInfoType6                        CellValueTag,
    sysInfoType7                        NULL,
    sysInfoType8                        CellValueTag,
    sysInfoType9                        NULL,
    sysInfoType10                       NULL,
    sysInfoType11                       CellValueTag,
    sysInfoType12                       CellValueTag,
    sysInfoType13                       CellValueTag,
    sysInfoType13-1                     CellValueTag,
    sysInfoType13-2                     CellValueTag,
    sysInfoType13-3                     CellValueTag,
    sysInfoType13-4                     CellValueTag,
    sysInfoType14                       NULL,
    sysInfoType15                       CellValueTag,
    sysInfoType16                       PredefinedConfigIdentityAndValueTag,
    sysInfoType17                       NULL,
    sysInfoTypeSB1                      CellValueTag,
    sysInfoTypeSB2                      CellValueTag,
    sysInfoType15-1                     CellValueTag,
    sysInfoType15-2                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-3                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-4                     CellValueTag,
    sysInfoType18                       CellValueTag,
    sysInfoType15-5                     CellValueTag
}

...

SysInfoType15 ::=                   SEQUENCE {
    -- Measurement IEs

        ue-positioning-GPS-CipherParameters     UE-Positioning-CipherParameters     OPTIONAL,
```

```
        ue-positioning-GPS-ReferenceLocation    ReferenceLocation,
        ue-positioning-GPS-ReferenceTime        UE-Positioning-GPS-ReferenceTime,

        ue-positioning-GPS-Real-timeIntegrity       BadSatList                          OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
}

SysInfoType15-1 ::=                 SEQUENCE {
    -- DGPS corrections
        ue-positioning-GPS-DGPS-Corrections         UE-Positioning-GPS-DGPS-Corrections,

    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}             OPTIONAL
}

SysInfoType15-2 ::=                 SEQUENCE {
-- Ephemeris and clock corrections
    transmissionTOW                 INTEGER (0..604799),
    satID                           SatID,
    ephemerisParameter              EphemerisParameter,
-- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}         OPTIONAL
}

SysInfoType15-3 ::=                 SEQUENCE {
    -- Almanac and other data
        transmissionTOW                 INTEGER (0.. 604799),
        ue-positioning-GPS-Almanac                  UE-Positioning-GPS-Almanac
    OPTIONAL,
        ue-positioning-GPS-IonosphericModel         UE-Positioning-GPS-IonosphericModel
    OPTIONAL,
        ue-positioning-GPS-UTC-Model                UE-Positioning-GPS-UTC-Model
    OPTIONAL,
        satMask                         BIT STRING (SIZE (1..32))   OPTIONAL,
        lsbTOW                          BIT STRING (SIZE (8))       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                 OPTIONAL
}


SysInfoType15-4 ::=                 SEQUENCE {
    -- Measurement IEs
        ue-positioning-OTDOA-CipherParameters   UE-Positioning-CipherParameters         OPTIONAL,
        ue-positioning-OTDOA-AssistanceData     UE-Positioning-OTDOA-AssistanceData,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions       SEQUENCE {}                     OPTIONAL
}


SysInfoType15-5 ::=                 SEQUENCE {
    -- Measurement IEs
        ue-positioning-OTDOA-AssistanceData-UEB     UE-Positioning-OTDOA-AssistanceData-UEB,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions       SEQUENCE {}                     OPTIONAL
}
```

13.4.32 VALUE_TAG

This variable contains information about the value tag for the last received system information block of a given type, for all system information blocks using value tags. The UE shall maintain one instance of this variable for the current selected cell. The UE may store several instances of this variable, one for each cell, to be used if the UE returns to these cells.

All IEs in this variable shall be cleared when switched off and as well as at selection of a new PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MIB value tag	OP		MIB value tag 10.3.8.9	Value tag for the master information block
SB 1 value tag	OP		Cell value tag 10.3.8.4	Value tag for the scheduling block type 1
SB 2 value tag	OP		Cell value tag 10.3.8.4	Value tag for the scheduling block type 2
SIB 1 value tag	CV-*GSM*		PLMN value tag 10.3.8.10	Value tag for the system information block type 1
SIB 2 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 2
SIB 3 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 3
SIB 4 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 4
SIB 5 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 5
SIB 6 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 6
CHOICE *mode*	MP			
>FDD				
>>SIB 8 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 8
>TDD				(no data)
SIB 11 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 11
SIB 12 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 12
SIB 13 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13
SIB 13.1 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.1
SIB 13.2 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.2
SIB 13.3 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.3
SIB 13.4 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.4
SIB 15 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15
SIB 15.1 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.1
SIB 15.2 value tag list	OP	1 to <maxSat>		List of value tags for all stored occurrences of system information block type 15.2
>SIB 15.2 value tag	MP		Cell value tag 10.3.8.4	
>SIB occurrence identity and value tag	MP		SIB occurrence identity and value tag 10.3.8.20b	
SIB 15.3 value tag list	OP	1 to <maxSat>		List of value tags for all stored occurrences of system information block type 15.3
>SIB 15.3 value tag	MP		PLMN value tag 10.3.8.10	Value tag for the system information block type 15.3
>SIB occurrence identity and value tag	MP		SIB occurrence identity and value tag 10.3.8.20b	
SIB 15.4 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.4
SIB 15.5 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.4

SIB 16 value tag list	OP	1 to <maxPredefConfig>		List of value tags for all stored occurrences of the system information block type 16
>Predefined configuration identity and value tag	MP		Predefined configuration identity and value tag 10.3.8.11	
SIB 18 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 18

Condition	Explanation
GSM	This information is optional when the PLMN Type in the variable SELECTED_PLMN is "GSM-MAP" and never stored otherwise.
ANSI	This information is optional when the PLMN Type in the variable SELECTED_PLMN is "ANSI-41" and never stored otherwise.

13.4.28a UE_POSITIONING_GPS_DATA

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GPS Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	
GPS Deciphering Keys	OP			
>Current deciphering key	MP		Bit string(56)	
>Next deciphering key	MP		Bit string(56)	
UE positioning GPS reference time	OP		UE positioning GPS reference time 10.3.7.96	
UE positioning GPS reference UE position	OP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	A priori knowledge of UE 3-D position.
UE positioning GPS DGPS corrections	OP		UE positioning GPS DGPS corrections 10.3.7.91	
UE positioning GPS navigation model	OP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	Satellite ID
>GPS Ephemeris and Clock Correction parameters	MP		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	
UE positioning GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
UE positioning GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
UE positioning GPS almanac	OP		~~UE positioning GPS almanac 10.3.7.89~~	
>SatID	MP	1 to <maxSat>		
>>WN_a	MP			
>>DataID	MP			Same as IE in 10.3.7.89
>>e	MP			Same as IE in 10.3.7.89
>>t_{oa}	MP			Same as IE in 10.3.7.89
>>δi	MP			Same as IE in 10.3.7.89
>>OMEGADOT	MP			Same as IE in 10.3.7.89
>>SV Health	MP			Same as IE in 10.3.7.89
>>$A^{1/2}$	MP			Same as IE in 10.3.7.89

>>OMEGA$_0$	MP			Same as IE in 10.3.7.89
>>M_0	MP			Same as IE in 10.3.7.89
>>ω	MP			Same as IE in 10.3.7.89
>>af_0	MP			Same as IE in 10.3.7.89
>>af_1	MP			Same as IE in 10.3.7.89
>SV Global Health	OP			Same as IE in 10.3.7.89
UE positioning GPS acquisition assistance	OP		UE positioning GPS acquisition assistance 10.3.7.88	
UE positioning GPS real-time integrity	OP		UE positioning GPS real-time integrity 10.3.7.95	
UE positioning GPS reference cell info	OP		UE positioning GPS reference cell info 10.3.7.95a	

13.4.28b UE_POSITIONING_OTDOA_DATA_UE_ASSISTED

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~OTDOA Data ciphering info~~	~~OP~~		~~UE positioning Ciphering info 10.3.7.86~~	
UE positioning OTDOA reference cell info for UE-assisted	OP		UE positioning OTDOA reference cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list for UE-assisted	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-assisted	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	

13.4.28c UE_POSITIONING_OTDOA_DATA_UE_BASED

Information Element/Group name	Need	Multi	Type and reference	Semantics description
OTDOA Deciphering Keys	OP			
>Current deciphering key	MP		Bit string(56)	
>Next deciphering key	MP		Bit string(56)	
OTDOA Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	
UE positioning OTDOA reference cell info for UE-based	OP		UE positioning OTDOA reference cell info for UE-based 10.3.7.108a	
UE positioning OTDOA neighbour cell list for UE-based	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-based	MP		UE positioning OTDOA neighbour cell info for UE-based 10.3.7.106	

14.7 UE positioning measurements

14.7.1 UE positioning measurement quantities

The quantity to measure for UE positioning is dependent on the positioning method and the method type requested in the IE "UE positioning reporting quantity".

1 SFN-SFN observed time difference type 2, mandatory.

2 Rx-Tx time difference type 2, optional.

3 GPS timing of cell fames, optional.

The definition of other GPS measurements is not within the scope of this specification.

14.7.2 Void

14.7.3 UE positioning reporting events

In the IE "UE positioning reporting criteria" ~~field~~ in the Measurement Control messages, the UTRAN notifies the UE of which events should trigger a measurement report. UE positioning reporting events that can trigger a report are given below. The content of the measurement report is dependant on the ~~location~~ positioning method and method type requested in the IE "UE positioning reporting quantity" of the Measurement Control message and is described in detail in [18].

14.7.3.1 Reporting Event 7a: The UE position changes more than an absolute threshold

This event is used for UE-based methods only.

When this event is ordered by UTRAN in a measurement control message, the UE shall

- -send a measurement report when the UE changes its position compared to the last reported position more than thea ~~predefined~~ threshold defined by the IE "Threshold position change";~~. This event is used for UE-based methods only.~~
- act as specified in section 8.6.7.19.1b.
- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,
  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;
- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,
  - delete this event from the list of events in variable MEASUREMENT_IDENTITY

14.7.3.2 Reporting Event 7b: SFN-SFN measurement changes more than an absolute threshold

~~This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~

When this event is ordered by UTRAN in a measurement control message, the UE shall

- -send a measurement report when the SFN-SFN time difference measurement type 2 of any measured cell changes more than ~~a predefined~~ the threshold defined by the IE "Threshold SFN-SFN change", and~~.~~ ~~This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~
- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE based”,
  - act as specified in section 8.6.7.19.1b;
- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted”,
  - act as specified in section 8.6.7.19.1a;
- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”,
  - the UE may choose to either act according to section 8.6.7.19.1a or 8.6.7.19.1b.
- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,
  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;
- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,
  - delete this event from the list of events in variable MEASUREMENT_IDENTITY;

14.7.3.3 Reporting Event 7c: GPS time and SFN time have drifted apart more than an absolute threshold

~~This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~

When this event is ordered by UTRAN in a measurement control message, the UE shall

- ~~-~~send a measurement report when the GPS Time Of Week and the SFN timer have drifted apart more than ~~a predefined~~ the threshold defined by the IE "Threshold SFN-GPS TOW", and~~.~~ ~~This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE based”,

  - act as specified in section 8.6.7.19.1b;

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted”,

  - act as specified in section 8.6.7.19.1a;

- if UTRAN set IE “Method Type” in UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”,

  - act as specified in section 8.6.7.19.1a or in section 8.6.7.19.1b depending on the method type chosen by the UE.

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,

  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,

  - delete this event from the list of events in variable MEASUREMENT_IDENTITY;

3GPP TSG-RAN WG2 Meeting #25 ***Tdoc R2-012756***
Makuhari, Japan, 26-30 November 2001

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1186** ⌘ **rev** **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Correction of UE Positioning
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	26-11-2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ UE Positioning specification is not complete for all RRC states

Summary of change: ⌘ The proposed changes are:

- in sections 8.1.1.6.15, 8.1.1.6.15.1, 8.1.1.6.15.2, 8.1.1.6.15.3 text was moved to 8.6.7.19.3 since this description applies for the GPS assistance data received in Sistem information or in Measurement Control or in Assistance Data Delivery meassages.

- in sections 8.1.1.6.15, 8.1.1.6.15.4 the handling of the ciphering info was moved to a new section 8.6.17.9.4

- in section 8.4.1.6, 8.4.1.7, 8.4.1.8 and 8.4.1.9 new description text was added to describe UE behavior when UP measurements are configured. This new text applies the principles proposed in Tdoc R2-012380 on handling of UP in RRC states

- in section 8.4.3 it is clarified that the Assistance Data Delivery procedure is initiated by UTRAn at the request from CN

- section 8.5.11 is updated to allow also to use the FACH measurement occasions for UP OTDOA when SFN-SFN type 2 on a different frequency is requested. The changes propose to keep the section 8.5.11 as a generic action and specify the case when the FACH measurement occasions shall be used in relevant sections in 8.4.1.6 and 8.4.1.9.

- section 8.6.7.1 is updated to include also the measurement validity for UP measurements

- section 8.6.7.19.1 is edited to be used as a pointer to new sections, e.g. 8.6.7.19.1a and 8.6.7.19.1b where it is specified who the UE will set the Measurement Report for UE assisted and UE-based methods

- sections 8.1.1.6.15.4, 8.6.7.19.2 and 2a, and tabular sections 10.2.48.8.18.4, 10.3.7.100, 10.3.7.103, 10.3.7.106, 10.3.7.108, and variable 13.4.28b are updated in order to allow the use of System information broadcast to be used for OTDOA

		UE-based assistance data which may be ciphered and also for OTDOA UE-assisted methods - new section 8.6.7.19.4 is added and variables 13.4.28a and 13.4.28c are updated in order to clarify the handling of deciphering keys. It is clarified also it is possible to have a couple of deciphering keys for each method, i.e. OTDOA or GPS. - new section 8.6.7.19.6 and tabular 10.3.7.90 are updated in order to introduce the information for the refernce cell to be used for UE GPS Timing of cell frames measurement. - section 8.6.7.20 clarifies that the measurement SFN-SFN type 2 should not be reported on RACH reporting - tabular 10.3.7.88, 10.3.7.96 is updated to allow alignement between 25.133 and RRC of the measurement UTRAN reporting of cell frames - tabular 10.3.7.93, 10.3.7.109 is updated allow alignement between 25.133 and RRC of the measurement UE reporting of cell frames - tabular 10.3.7.105 is updated to introduce the frequency info for neighboring cell reporting - tabular 10.3.7.108 is updated to remove the frequency info of the reference cell for OTDOA measurements since it is assumed to the same as the current frequency - tabular 10.3.7.111 is updated to introduce the vertical accuracy and rename the accuracy in horizontal accuracy. this is in line with RANAP. it is alos propose to remove the multiple sets from the tabular as decided in last RAN2#24 meeting. - section 14.7.3 description text added Corrections to Rev1 (highlighted in "green"): ASN.1 corrections are added according to the following principle. All ASN.1 corrections are done using the non-critical extension mechanism for OTDOA UE assisted method. The other corrections are done in a straight forward corrections. **-** added new SIB15.5 to broadcast Assistance data possibly ciphered for UE based OTDOA. SIB15.4 is left unciphered for UE-assisted OTDOA - corrected the granularity and the mapping of Node B Clock drift and SFN-SFN time drift and alignment with RAN3 - corrected the handling of the Week Number for the Almanac
Consequences if not approved:	⌘	UE behavior for UE Positioning is unclear and unspecified

Clauses affected:	⌘	8.1.1.1.2, 8.1.1.6.15, 8.1.1.6.15.1, 8.1.1.6.15.2, 8.1.1.6.15.3, 8.1.1.6.15.4, 8.1.1.6.15.5 (new), 8.4.1.3, 8.4.1.6.7, 8.4.1.7.5 (new), 8.4.1.8.5 (new), 8.4.1.9.5 (new), 8.4.1.9a.4 (new), 8.4.2.2, 8.4.3.2, 8.4.3.3, 8.5.11, 8.6.7.1, 8.6.7.18a (new), 8.6.7.19.0 (new) , 8.6.7.19.1, 8.6.7.19.1a (new) , 8.6.7.19.1b (new) , 8.6.7.19.2, 8.6.7.19.2a (new) , 8.6.7.19.3, 8.6.7.19.3.1, 8.6.7.19.3.2, 8.6.7.19.3.3, 8.6.7.19.3.3a (new) , 8.6.7.19.3.4, 8.6.7.19.3.5, 8.6.7.19.3.6, 8.6.7.19.3.7, 8.6.7.19.3.8, 8.6.7.19.4 (new) , 8.6.7.19.5 (new) , 8.6.7.19.6 (new), 8.6.7.21 (new), 10.2.4, 10.2.48.8.18.4, 10.2.48.8.18.4a (new), 10.3.3.45, 10.3.7.51, 10.3.7.86, 10.3.7.87, 10.3.7.88, 10.3.7.89, 10.3.7.90, 10.3.7.91, 10.3.7.93, 10.3.7.95a (new), 10.3.7.96, 10.3.7.99, 10.3.7.100, 10.3.7.101, 10.3.7.103, 10.3.7.103a (new) , 10.3.7.105, 10.3.7.106, 10.3.7.106a (new) , 10.3.7.108, 10.3.7.108a (new) , 10.3.7.109, 10.3.7.109a (new) , 10.3.7.111, 10.3.8.21, 10.3.8.22, 11.2, 11.3, 13.4.28a, 13.4.28b, 13.4.28c (new), 13.4.32, 14.7.3,

		14.7.3.1, 14.7.3.2, 14.7.3.3			
Other specs affected:	⌘	X	Other core specifications	⌘	25.331 v3.8.0, CR 1185r3
		X	Test specifications		
			O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.1.1.2 System information blocks

Table 8.1.1 specifies all system information blocks and their characteristics.

The *area scope column* in table 8.1.1 specifies the area where a system information block's value tag is valid. If the area scope is *cell*, the UE shall consider the system information block to be valid only in the cell in which it was read. If system information blocks have been previously stored for this cell, the UE shall check whether the value tag for the system information block in the entered cell is different compared to the stored value tag. If the area scope is *PLMN*, the UE shall check the value tag for the system information block when a new cell is selected. If the value tag for the system information block in the new cell is different compared to the value tag for the system information block stored in the UE, the UE shall re-read the system information block.

For System information block types 15.2, 15.3 and 16, which may have multiple occurrences, each occurrence has its own independent value tag. The UE- shall re-read a particular occurrence if the value tag of this occurrence has changed compared to that stored in the UE.

The *UE mode/state column when block is valid* in Table 8.1.1 specifies in which UE mode or UE state the IEs in a system information block shall be regarded as valid by the UE. In other words, the indicated system information block becomes invalid upon change to a mode/state that is not included in this column. In some cases, the states are inserted in brackets to indicate that the validity is dependent on the broadcast of the associated System Information Blocks by the network as explained in the relevant procedure section.

The *UE mode/state column when block is read* in Table 8.1.1 specifies in which UE mode or UE state the IEs in a system information block may be read by the UE. The UE shall have the necessary information prior to execution of any procedure requiring information to be obtained from the appropriate system information block. The requirements on the UE in terms of when to read the system information may therefore be derived from the procedure specifications that specify which IEs are required in the different UE modes/states in conjunction with the different performance requirements that are specified. System Information Block type 10 shall only be read by the UE while in CELL_DCH.

NOTE: There are a number of system information blocks that include the same IEs while the UE mode/state in which the information is valid differs. This approach is intended to allows the use of different IE values in different UE mode/states.

The *Scheduling information* column in Table 8.1.1 specifies the position and repetition period for the SIB.

The *modification of system information* column in Table 8.1.1 specifies the update mechanisms applicable for a certain system information block. For system information blocks with a value tag, the UE shall update the information according to subclause 8.1.1.7.1 or 8.1.1.7.2. For system information blocks with an expiration timer, the UE shall, when the timer expires, perform an update of the information according to subclause 8.1.1.7.4.

Table 8.1.1: Specification of system information block characteristics

System information block	Area scope	UE mode/state when block is valid	UE mode/state when block is read	Scheduling information	Modification of system information	Additional comment
Master information block	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	SIB_POS = 0 SIB_REP = 8 (FDD) SIB_REP = 8, 16, 32 (TDD) SIB_OFF=2	Value tag	
Scheduling block 1	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information" in MIB	Value tag	
Scheduling block 2	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information" in MIB	Value tag	
System information block type 1	PLMN	Idle mode CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 2	Cell	URA_PCH	URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 3	Cell	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH)	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH)	Specified by the IE "Scheduling information"	Value tag	
System information block type 4	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	If System information block type 4 is not broadcast in a cell, the connected mode UE shall apply information in System information block type 3 in connected mode.
System information block type 5	Cell	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only))	Idle mode, (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only))	Specified by the IE "Scheduling information"	Value tag	

System information block type 6	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Specified by the IE "Scheduling information"	Value tag	If system information block type 6 is not broadcast in a cell, the connected mode UE shall read System information block type 5. If some of the optional IEs are not included in System information block type 6, the UE shall read the corresponding IEs in System information block type 5 In TDD mode system information block 6 shall only be read in CELL_DCH if required for open loop power control as specified in subclause 8.5.7 and/or if shared transport channels are assigned to the UE. If in these cases system information block type 6 is not broadcast the UE shall read system information block type 5.
System information block type 7	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH (TDD only)	Specified by the IE "Scheduling information"	Expiration timer = MAX(320 ms,SIB_REP * ExpirationTimeFactor)	In TDD mode system information block type 7 shall only be read in CELL_DCH if shared transport channels are assigned to the UE.
System information block type 8	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 9	Cell	CELL_FACH, CELL_PCH, URA_PCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	
System information block type 10	Cell	CELL_DCH	CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	
System information block type 11	Cell	Idle mode (CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH)	Idle mode (CELL_FACH, CELL_PCH, URA_PCH)	Specified by the IE "Scheduling information"	Value tag	

System information block type 12	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	If system information block type 12 is not broadcast in a cell, the connected mode UE shall read System information block type 11. If some of the optional IEs are not included in System information block type 12, the UE shall read the corresponding IEs in System information block type 11.
System information block type 13	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.1	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.2	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.3	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 13.4	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 14	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = MAX([320 ms], SIB_REP * ExpirationTimeFactor)	This system information block is used in TDD mode only. System information block type 14 shall only be read in CELL_DCH if required for open loop power control as specified in subclause 8.5.7.
System information block type 15	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 15.1	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 15.2	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 15.3	PLMN	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 15.4	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	

System information block type 15.5	Cell	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	
System information block type 16	PLMN	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Idle Mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	For this system information block there may be multiple occurrences
System information block type 17	Cell	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Specified by the IE "Scheduling information"	Expiration timer = SIB_REP	This system information block is used in TDD mode only. System information block type 17 shall only be read if shared transport channels are assigned to the UE.
System Information Block type 18	Cell	Idle mode, CELL_FACH, CELL_PCH, URA_PCH, CELL_DCH	Idle mode, CELL_FACH, CELL_PCH, URA_PCH	Specified by the IE "Scheduling information"	Value tag	

The UE shall acquire all system information blocks except system information block type 10 on BCH. System Information Block type 10 shall be acquired on the FACH and only by UEs with support for simultaneous reception of one SCCPCH and one DPCH. If System Information Block type 10 is not broadcast in a cell, the DRAC procedures do not apply in this cell. System Information Block type 10 is used in FDD mode only.

8.1.1.6.15 System Information Block type 15

If the UE is in idle or connected mode, and supports GPS location services ~~and/or OTDOA location services~~ it should store all relevant IEs included in this system information block. The UE shall:

- if the IE "GPS Data ciphering info" is included, ~~and the UE has a full or reduced complexity GPS receiver functionality (the UE will know that the broadcast GPS data is ciphered in accordance with the Data Assistance Ciphering Algorithm detailed in [18])~~:

  ~~- store the parameters contained within this IE (see 10.3.7.86 for details) in the IE "GPS Data ciphering info" in variable UE_POSITIONING_GPS_DATA; and~~

  ~~- use them to decipher the broadcast UE positioning GPS information contained within the System Information Block types 15.1, 15.2 and 15.3;~~ act as specified in the subclause 8.6.7.19.4;

- ~~store the~~ act upon the received IE "Reference position" as specified in subclause 8.6.7.19.3.8; ~~in the IE "UE positioning GPS reference UE position" in variable UE_POSITIONING_GPS_DATA and use it as a priori knowledge of the approximate location of the UE;~~

- ~~store the~~ act upon the received IE "GPS reference time" as specified in subclause 8.6.7.19.3. ~~in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and use it as a reference GPS time;~~

- ~~use "GPS TOW msec" as GPS Time of Week in milliseconds;~~

- ~~if the IE "GPS TOW rem usec" is included in the IE "GPS reference time":~~

  ~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as GPS Time of Week in microseconds;~~

- ~~if the IE "NODE B Clock Drift" is included in the IE "GPS reference time":~~

  ~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as an estimate of the drift rate of the NODE B clock relative to GPS time;~~

- ~~if the IE "NODE B Clock Drift" is not included in the IE "GPS reference time":~~

  ~~- assume the value 0;~~

- ~~if SFN is included in the IE "GPS reference time" and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not included:~~

  ~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as the relationship between GPS time and air interface timing of the NODE B transmission in the serving cell;~~

- ~~if SFN is included in IE "GPS reference time" and IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:~~

  ~~- store it in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and may use it as the relationship between GPS time and air interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";~~

- if IE "Satellite information" is included:

  - act upon this list of bad satellites as specified in subclause 8.6.7.19.3.6.

NOTE: For efficiency purposes, the UTRAN should broadcast System Information Block type 15 if it is broadcasting System Information Block type 15.2.

8.1.1.6.15.1 System Information Block type 15.1

The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

- ~~use "Status/Health" in the IE "DGPS Corrections" to determine the status of the differential corrections;~~

- act on "DGPS information" in the IE "DGPS Corrections" in a similar manner as specified in [13] except that the scale factors for PRC and RRC are different. In addition, the IE group DGPS information also includes Delta PRC2 and Delta RRC2. Delta PRC2 is the difference in the pseudorange correction between the satellite's ephemeris identified by IODE and the previous ephemeris two issues ago IODE –2. Delta RRC2 is the difference in the pseudorange rate-of-change correction between the satellite's ephemeris identified by IODE and IODE-2. These two additional IEs can extend the life of the raw ephemeris data up to 6 hours. If the IEs "Delta PRC3" and "Delta RRC3" are included, UE may use them as appropriate e.g. to extend the life of the raw ephemeris data up to 8 hours;

- act upon the received IE "UE Positioning GPS DGPS corrections" as specified in subclause 8.6.7.19.3.3.

8.1.1.6.15.2 System Information Block type 15.2

For System Information Block type 15.2 multiple occurrences may be used; one occurrence for one satellite. To identify the different occurrences, the scheduling information for System Information Block type 15.2 includes IE "SIB occurrence identity and value tag". The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

- compare for each occurrence the value tag of the stored occurrence, if any, with the occurrence value tag included in the IE "SIB occurrence identity and value tag" for the occurrence of the SIB with the same occurrence identity;

- in case the UE has no SIB occurrence stored with the same identity or in case the occurrence value tag is different:

  - store the occurrence information together with its identity and value tag for later use;

- in case an occurrence with the same identity but different value tag was stored:

  - overwrite this one with the new occurrence read via system information for later use;

- interpret IE "Transmission TOW" as a very coarse estimate of the current time, i.e., the approximate GPS time-of-week when the message is broadcast;

- interpret IE "SatID" as the satellite ID of the data from which this message was obtained;

- act upon the received IEs "Sat ID" and "GPS Ephemeris and Clock Corrections Parameter" as specified in subclause 8.6.7.19.3.4;

- ~~act on the rest of the IEs in a manner similar to that specified in [12]. In addition, the UE can utilise these IEs for GPS time dissemination and sensitivity improvement.~~

The IE "Transmission TOW" may be different each time a particular SIB occurrence is transmitted. The UTRAN should not increment the value tag of the SIB occurrence if the IE "Transmission TOW" is the only IE that is changed.

The UE may not need to receive all occurrences before it can use the information from any one occurrence.

8.1.1.6.15.3 System Information Block type 15.3

For System Information Block type 15.3 multiple occurrences may be used; one occurrence for each set of satellite data. To identify the different occurrences, the scheduling information for System Information Block type 15.3 includes IE "SIB occurrence identity and value tag". The UE should store all the relevant IEs included in this system information block in variable UE_POSITIONING_GPS_DATA. The UE shall:

- compare for each occurrence the value tag of the stored occurrence, if any, with the occurrence value tag included in the IE "SIB occurrence identity and value tag" for the occurrence of the SIB with the same occurrence identity;

- in case the UE has no SIB occurrence stored with the same identity or in case the occurrence value tag is different:

  - store the occurrence information together with its identity and value tag for later use;

- in case an occurrence with the same identity but different value tag was stored:

- overwrite this one with the new occurrence read via system information for later use;

- interpret IE "Transmission TOW" as a very coarse estimate of the current time, i.e., the approximate GPS time-of-week when the message is broadcast;

~~- interpret IE "SatMask" as the satellites that contain the pages being broadcast in this message;~~

~~- interpret IE "LSB TOW" as the least significant 8 bits of the TOW ([12]);~~

~~- interpret "Data ID" in the IE "UE positioning GPS almanac" as the Data ID field contained in the indicated subframe, word 3, most significant 2 bits, as defined by [12];~~

- if the IE "GPS Almanac and Satellite Health" is included:

  - interpret IE "SatMask" as the satellites that contain the pages being broadcast in this message;

  - interpret IE "LSB TOW" as the least significant 8 bits of the TOW ([12]);

  - act upon the received IE “GPS Almanac and Satellite Health” as specified in subclause 8.6.7.19.3.2;

- if the IE "GPS UTC model" is included:

  - act upon the received IE “GPS UTC model” as specified in subclause 8.6.7.19.3.9;

~~- act on the rest of the IEs in a similar manner as specified in [12]. In addition, the UE can utilise these IEs including non-information bits for GPS time dissemination and sensitivity improvement.~~

The IE "Transmission TOW" may be different each time a particular SIB occurrence is transmitted. The UTRAN should not increment the value tag of the SIB occurrence if the IE "Transmission TOW" is the only IE that is changed. One SIB occurrence value tag is assigned to the table of subclause 10.2.48.8.18.3.

The UE may not need to receive all occurrences before it can use the information for any one occurrence.

8.1.1.6.15.4 System Information Block type 15.4

If the UE is in idle mode or connected mode, the UE shall:

- if the IE "OTDOA ciphering info" is included:

  - act as specified in subclause 8.6.7.19.4;

If the UE is in connected mode, the UE shall:

- act as specified in subclause 8.6.7.19.2.

~~If the UE is in idle or connected mode, and supports the UE-based OTDOA UE positioning method the UE shall:~~

~~- act as specified in subclause 8.6.7.19.3.2;~~

~~- store IE "OTDOA ciphering info" in OTDOA Data ciphering info in variable UE_POSITIONING_OTDOA_DATA if it is included.~~

8.1.1.6.15.5 System Information Block type 15.5

If the UE is in idle or connected mode, the UE shall:

- if the UE supports UE-based OTDOA positioning:

  - act as specified in subclause 8.6.7.19.2a;

8.4 Measurement procedures

8.4.0 Measurement related definitions

UTRAN may control a measurement in the UE either by broadcast of SYSTEM INFORMATION and/or by transmitting a MEASUREMENT CONTROL message.

The following information is used to control the UE measurements and the measurement results reporting:

1. **Measurement identity**: A reference number that should be used by the UTRAN when setting up, modifying or releasing the measurement and by the UE in the measurement report.
2. **Measurement command**: One out of three different measurement commands.
   - Setup: Setup a new measurement.
   - Modify: Modify a previously defined measurement, e.g. to change the reporting criteria.
   - Release: Stop a measurement and clear all information in the UE that are related to that measurement.
3. **Measurement type**: One of the types listed below describing what the UE shall measure.

Presence or absence of the following control information depends on the measurement type

4. **Measurement objects:** The objects on which the UE shall measure measurement quantities, and corresponding object information.
5. **Measurement quantity:** The quantity the UE shall measure on the measurement object. This also includes the filtering of the measurements.
6. **Reporting quantities:** The quantities the UE shall include in the report in addition to the quantities that are mandatory to report for the specific event.
7. **Measurement reporting criteria**: The triggering of the measurement report, e.g. periodical or event-triggered reporting.
8. **Measurement Validity**: Defines in which UE states the measurement is valid.
9. **Measurement reporting mode**: This specifies whether the UE shall transmit the measurement report using AM or UM RLC.
10. **Additional measurement identities**: A list of references to other measurements. When this measurement triggers a measurement report, the UE shall also include the reporting quantities for the measurements referenced by the additional measurement identities.

All these measurement parameters depend on the measurement type and are described in more detail in clause 14.

The different types of measurements are:

- **Intra-frequency measurements**: measurements on downlink physical channels at the same frequency as the active set. A measurement object corresponds to one cell. Detailed description is found in subclause 14.1.
- **Inter-frequency measurements**: measurements on downlink physical channels at frequencies that differ from the frequency of the active set. A measurement object corresponds to one cell. Detailed description is found in subclause 14.2.
- **Inter-RAT measurements**: measurements on downlink physical channels belonging to another radio access technology than UTRAN, e.g. GSM. A measurement object corresponds to one cell. Detailed description is found in subclause 14.3.
- **Traffic volume measurements**: measurements on uplink traffic volume. A measurement object corresponds to one cell. Detailed description is found in subclause 14.4.

- **Quality measurements**: Measurements of downlink quality parameters, e.g. downlink transport block error rate. A measurement object corresponds to one transport channel in case of BLER. A measurement object corresponds to one timeslot in case of SIR (TDD only). Detailed description is found in subclause 14.5.

- **UE-internal measurements**: Measurements of UE transmission power and UE received signal level. Detailed description is found in subclause 14.6.

- **UE positioning measurements:** Measurements of UE position. Detailed description is found in subclause 14.7.

The UE shall support a number of measurements running in parallel as specified in [19] and [20]. The UE shall also support that each measurement is controlled and reported independently of every other measurement.

Cells that the UE is monitoring are grouped in the UE into three different categories:

1. Cells, which belong to the **active set.** User information is sent from all these cells. In FDD, the cells in the active set are involved in soft handover. In TDD the active set always comprises one cell only.

2. Cells, which are not included in the active set, but are monitored according to a neighbour list assigned by the UTRAN belong to the **monitored set.**

3. Cells detected by the UE, which are neither included in the active set nor in the monitored set belong to the **detected set.** Reporting of measurements of the detected set is only applicable to intra-frequency measurements made by UEs in CELL_DCH state.

8.4.1 Measurement control

Figure 56: Measurement Control, normal case

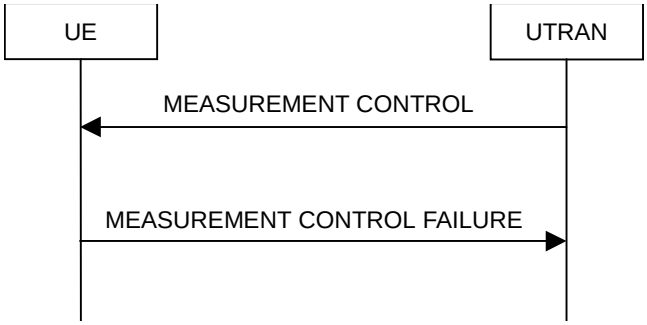

Figure 57: Measurement Control, failure case

8.4.1.1 General

The purpose of the measurement control procedure is to setup, modify or release a measurement in the UE.

8.4.1.2 Initiation

The UTRAN may request a measurement by the UE to be setup, modified or released with a MEASUREMENT CONTROL message, which is transmitted on the downlink DCCH using AM RLC.

The UTRAN should take the UE capabilities into account when a measurement is requested from the UE.

When a new measurement is created, UTRAN should set the IE "Measurement identity" to a value, which is not used for other measurements. UTRAN may use several "Measurement identity" for the same "Measurement type". In case of

setting several "Measurement identity" within a same "Measurement type", the measurement object or the list of measurement objects can be set differently for each measurement with different "Measurement identity ".

When a current measurement is modified or released, UTRAN should set the IE "Measurement identity" to the value, which is used for the measurement being modified or released. In case of modifying IEs within a "Measurement identity", it is not needed for UTRAN to indicate the IEs other than modified IEs, and the UE continues to use the current values of the IEs that are not modified.

8.4.1.3 Reception of MEASUREMENT CONTROL by the UE

Upon reception of a MEASUREMENT CONTROL message the UE shall perform actions specified in subclause 8.6 unless otherwise specified below.

The UE shall:

- read the IE "Measurement command";
- if the IE "Measurement command" has the value "setup":
  - store this measurement in the variable MEASUREMENT_IDENTITY according to the IE "measurement identity", possibly overwriting the measurement previously stored with that identity;
  - for measurement types "inter-RAT measurement" or "inter-frequency measurement":
    - if, according to its measurement capabilities, the UE requires compressed mode to perform the measurements and a compressed mode pattern sequence with an appropriate measurement purpose is simultaneously activated by the IE "DPCH compressed mode status info"; or
    - if, according to its measurement capabilities, the UE does not require compressed mode to perform the measurements:
      - if the measurement is valid in the current RRC state of the UE:
        - begin measurements according to the stored control information for this measurement identity;
  - for measurement type “UE positioning measurement”:
    - if the UE is in CELL_FACH state:
      - if IE “Positioning Method” is set to “OTDOA”:
        - if IE “Method Type” is set to “UE assisted”:
          - if IE “UE positioning OTDOA assistance data for UE assisted” is not included:
            - if System Information Block 15.4 is broadcast:
              - read System Information Block 15.4;
            - act as specified in section 8.6.7.19.2;
        - if IE “Method Type” is set to “UE based”:
          - if IE “UE positioning OTDOA assistance data for UE based” is not included:
            - if System Information Block 15.5 is broadcast:
              - read System Information Block 15.5;
            - act as specified in section 8.6.7.19.2a;
  - ~~for measurement type "UE positioning measurement":~~
    - ~~if the IE "Positioning method" is set to "GPS" and UE has neither received nor stored sufficient assistance data in variable UE_POSITIONING_GPS_DATA to perform the requested measurements:~~

~~- send a MEASUREMENT REPORT message to UTRAN, indicating the kind of assistance data which is necessary to fulfil the measurement request in the IE "UE positioning error";~~

- for any other measurement type:
  - if the measurement is valid in the current RRC state of the UE:
    - begin measurements according to the stored control information for this measurement identity.

- if the IE "Measurement command" has the value "modify":
  - for all measurement control present in the MEASUREMENT CONTROL message:
    - if a measurement was stored in the variable MEASUREMENT_IDENTITY associated to the identity by the IE "measurement identity":
      - replace the corresponding information stored in variable MEASUREMENT_IDENTITY associated to the identity indicated by the IE "measurement identity";
      - resume the measurements according to the new stored measurement control information.
    - otherwise:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if the IE "measurement command" has the value "release":
  - terminate the measurement associated with the identity given in the IE "measurement identity";
  - clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY.
- if the IE "DPCH Compressed Mode Status Info" is present,:
  - and if, as the result of this message, UE will have more than one transmission gap pattern sequence with the same measurement purpose active (according to IE 'TGMP' in variable TGPS_IDENTITY):
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
  - if pattern sequence corresponding to IE "TGPSI" is already active (according to "TGPS Status Flag"):
    - deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message;
  - after the time indicated by IE "TGPS reconfiguration CFN" has elapsed:
    - activate the pattern sequence stored in the variable TGPS_IDENTITY corresponding to each IE "TGPSI" for which the "TGPS status flag" is set to "active" at the time indicated by IE "TGCFN"; and
    - begin the inter-frequency and/or inter-RAT measurements corresponding to the pattern sequence measurement purpose of each activated pattern sequence;
    - if the values of IE "TGPS reconfiguration CFN" and IE "TGCFN" are equal:
      - start the concerned pattern sequence immediately at that CFN;
  - not alter pattern sequences stored in variable TGPS_IDENTITY, but not identitifed in IE "TGPSI"
- if the UE in CELL_FACH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in the variable MEASUREMENT_IDENTITY:
  - update the stored information with the traffic volume measurement control information in variable MEASUREMENT_IDENTITY; and
  - refrain from updating the traffic volume measurement control information associated with this measurement identity received in System Information Block type 12 (or System Information Block type 11, according to

subclause 8.1.1.6.11) until this measurement is explicitly released with another MEASUREMENT CONTROL message;

- if the IE "Read SFN indicator" included in the IE "Cell info" of an inter-frequency cell is set to TRUE and the variable UE_CAPABILITY_TRANSFERRED has the DL "Measurement capability" for "FDD measurements" set to TRUE (the UE requires DL compressed mode in order to perform measurements on FDD):
  - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- clear the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS;
- and the procedure ends.

The UE may:

- if the IE "Measurement command" has the value "setup":
  - for measurement type “UE positioning measurement”:
    - if the UE is CELL_FACH state:
      - if IE “Positioning Method” is set to “GPS”:
        - if IE “UE positioning GPS assistance data” is not included and variable UE_POSITIONING_GPS_DATA is empty:
          - if System Information Block 15, 15.1, 15.2 and 15.3 are broadcast:
            - read System Information Block 15, 15.1, 15.2 and 15.3;
          - act as specified in section 8.6.7.19.3;

8.4.1.4 Unsupported measurement in the UE

If UTRAN instructs the UE to perform a measurement that is not supported by the UE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.
- set the cause value in IE "failure cause" to "unsupported measurement";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

8.4.1.4a Configuration Incomplete

If the variable CONFIGURATION_INCOMPLETE is set to TRUE, the UE shall:

- retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;
- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS and clear that entry;

- clear the variable CONFIGURATION_INCOMPLETE;
- set the cause value in IE "failure cause" to "Configuration incomplete";
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

8.4.1.5 Invalid MEASUREMENT CONTROL message

If the MEASUREMENT CONTROL message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry.
- set the IE "failure cause" to the cause value "protocol error";
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;
- continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;
- and the procedure ends.

8.4.1.6 Measurements after transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state:

8.4.1.6.1 Intra-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop intra-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type intra-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and the IE "Maximum number of Reported cells on RACH" IEs from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):

- use this information for reporting measured results in RACH messages.

8.4.1.6.2 Inter-frequency measurement

Upon transition from CELL_DCH to CELL_FACH/ CELL_PCH/URA_PCH state, the UE shall:

- stop the inter-frequency type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type inter-frequency associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- in CELL_FACH state:
  - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.6.3 Inter-RAT measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop the inter-RAT type measurement reporting assigned in a MEASUREMENT CONTROL message;
- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE; or
- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or
- if the transition is not due to a reconfiguration message:
  - delete the measurements of type inter-RAT associated with the variable MEASUREMENT_IDENTITY;
- begin monitoring cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- in CELL_FACH state:
  - perform measurements on other systems according to the IE "FACH measurement occasion info".

8.4.1.6.4 Quality measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop quality type measurement reporting;
- delete all measurement control information of measurement type "quality" stored in the variable MEASUREMENT_IDENTITY.

8.4.1.6.5 UE internal measurement

Upon transition from CELL_DCH to CELL_FACH/CELL_PCH/URA_PCH state, the UE shall:

- stop UE internal measurement type measurement reporting;
- delete all measurement control information of measurement type "UE internal" stored in the variable MEASUREMENT_IDENTITY.

8.4.1.6.6 Traffic volume measurement

Upon transition from CELL_DCH to CELL_FACH or CELL_PCH or URA_PCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "traffic volume" stored in the variable MEASUREMENT_IDENTITY; and
  - if the optional IE "measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "CELL_DCH":
    - stop measurement reporting;
    - store the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_DCH state;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
    - continue measurement reporting;
  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - resume this measurement and associated reporting;
- if no traffic volume type measurements valid in CELL_FACH or CELL_PCH or URA_PCH states are stored in the variable MEASUREMENT_IDENTITY:
    - store the measurement control information from the IE "Traffic volume measurement system information" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) in the variable MEASUREMENT_IDENTITY;
    - begin traffic volume measurement reporting according to the assigned information.

8.4.1.6.7 UE positioning measurement

~~FFS.~~ Upon transition from CELL_DCH to CELL_FACH or CELL_PCH or URA_PCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "UE positioning" stored in the variable MEASUREMENT_IDENTITY; and
  - if the optional IE "measurement validity" for this measurement has not been included:
    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "CELL_DCH":
    - stop measurement reporting;
    - store the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_DCH state;
  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":
    - continue measurement reporting;
  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "all states except CELL_DCH":
    - resume this measurement and associated reporting;

- if the transition is due to a reconfiguration message which included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects a cell other than that indicated by this IE; or

- if the transition is due to a reconfiguration message which does not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD); or

- if the transition is not due to a reconfiguration message:

  - delete the assistance data included in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, UE_POSITIONING_OTDOA_DATA_UE_ASSISTED and UE_POSITIONING_GPS_DATA;

- if the IE "Positioning Methods" stored in the variable MEASUREMENT_IDENTITY is set to "OTDOA" or "OTDOA or GPS":

  - if the IE "Method type" stored in the variable MEASUREMENT_IDENTITY is set to "UE-based" or "UE assisted preferred but UE based allowed" or "UE based preferred but UE assisted allowed":

    - begin monitoring assistance data received in System Information Block type 15.4 and System Information Block type 15.5 according to subclause 8.1.1.6.15;

  - if the IE "Method type" stored in the variable MEASUREMENT_IDENTITY is set to "UE-assisted":

    - begin monitoring assistance data received in System Information Block type 15.4 according to subclause 8.1.1.6.15;

- if the UE is in CELL_FACH state:

  - if the IE "UE positioning OTDOA neighbour cell list for UE assisted" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED or UE_POSITIONING_OTDOA_DATA_UE_BASED contains neighbour cells on other frequencies than the current frequency:

    - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

The UE may:

- if the IE "Positioning Methods" stored in the variable MEASUREMENT_IDENTITY is set to "GPS" or "OTDOA or GPS":

  - begin monitoring assistance data received in System Information Block type 15 and/or System Information Block type 15.1 and/or System Information Block type 15.2 and/or System Information Block type 15.3 according to subclause 8.1.1.6.15.

8.4.1.6a Actions in CELL_FACH/CELL_PCH/URA/PCH state upon cell re-selection

Upon cell reselection while in CELL_FACH/CELL_PCH/URA/PCH state and the cell reselection has occurred after the measurement control information was stored, the UE shall:

- delete the all measurements of type intra-frequency, inter-frequency, and inter-RAT associated with the variable MEASUREMENT_IDENTITY.

8.4.1.7 Measurements after transition from CELL_FACH to CELL_DCH state

The UE shall apply the following rules for different measurement types after transiting from CELL_FACH to CELL_DCH state:

8.4.1.7.1 Intra-frequency measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "intra-frequency" stored in the variable MEASUREMENT_IDENTITY;

- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH:

  - resume the measurement reporting;

- if no intra-frequency measurements applicable to CELL_DCH state are stored in the variable MEASUREMENT_IDENTITY:

  - continue monitoring the list of neighbouring cells assigned in the IE "intra-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

  - if the IE "intra-frequency measurement reporting criteria" was included in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):

    - send the MEASUREMENT REPORT message when reporting criteria in IE "Reporting information for CELL_DCH" are fulfilled;

8.4.1.7.2 Inter-frequency measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- retrieve each set of measurement control information of measurement type "inter-frequency" stored in the variable MEASUREMENT_IDENTITY; and

- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH":

  - resume the measurement reporting.

8.4.1.7.3 Inter-RAT measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-RAT cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- retrieve each set of measurement control information of measurement type "inter-RAT" stored in the variable MEASUREMENT_IDENTITY; and

- if the IE "measurement validity" for a measurement has been assigned the value "CELL_DCH":

  - resume the measurement reporting.

8.4.1.7.4 Traffic volume measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "traffic volume" stored in the variable MEASUREMENT_IDENTITY;

  - if the optional IE "measurement validity" for this measurement has not been included:

    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;

  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states except CELL_DCH":

    - stop measurement reporting; and

    - save the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_FACH/CELL_PCH/URA_PCH state;

  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":

- continue measurement reporting;

- if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "CELL_DCH":

  - resume this measurement and associated reporting;

- if no traffic volume type measurement has been assigned to the UE with a MEASUREMENT CONTROL message when transiting to CELL_DCH state:

  - continue an ongoing traffic volume type measurement, assigned in System Information Block type 11 (or System Information Block type 12, according to subclause 8.1.1.6.11);

- if the UE in CELL_DCH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in variable MEASUREMENT_IDENTITY:

  - update the stored information with the traffic volume measurement control information in variable MEASUREMENT_IDENTITY.

8.4.1.7.5 UE positioning measurement

Upon transition from CELL_FACH to CELL_DCH state, the UE shall:

- retrieve each set of measurement control information of measurement type "UE positioning" stored in the variable MEASUREMENT_IDENTITY; and

  - if the optional IE "Measurement validity" for this measurement has not been included:

    - delete the measurement associated with the variable MEASUREMENT_IDENTITY;

  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states except CELL_DCH":

    - stop measurement reporting; and

    - save the measurement associated with the variable MEASUREMENT_IDENTITY to be used after the next transition to CELL_FACH/CELL_PCH/URA_PCH state;

  - if the IE "measurement validity" for the measurement has been included, and the IE "UE state" has been assigned to value "all states":

    - continue measurement reporting;

  - if the IE "measurement validity" has been included and the IE "UE state" has been assigned to value "CELL_DCH":

    - resume this measurement and associated reporting;

- stop monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block 15.5.

8.4.1.8 Measurements after transition from idle mode to CELL_DCH state

The UE shall obey the following rules for different measurement types after transiting from idle mode to CELL_DCH state:

8.4.1.8.1 Intra-frequency measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- begin or continue monitoring the list of cells assigned in the IE "intra-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- if the "intra-frequency measurement reporting criteria" IE was included in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):

  - begin measurement reporting according to the IE.

8.4.1.8.2 Inter-frequency measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-frequency cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11).

8.4.1.8.3 Inter-RAT measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring the list of cells assigned in the IE "inter-RAT cell info list" in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11).

8.4.1.8.4 Traffic volume measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- begin a traffic volume type measurement, assigned in System Information Block type 11 (or System Information Block type 12, according to subclause 8.1.1.6.11).

8.4.1.8.5 UE positioning measurement

Upon transition from idle mode to CELL_DCH state, the UE shall:

- stop monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5;

8.4.1.9 Measurements after transition from idle mode to CELL_FACH state

The UE shall obey the follow rules for different measurement types after transiting from idle mode to CELL_FACH state:

8.4.1.9.1 Intra-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- if the UE receives the IE "Intra-frequency reporting quantity for RACH Reporting" and IE "Maximum number of Reported cells on RACH" from System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11):

  - use this information for reporting measured results in RACH messages.

8.4.1.9.2 Inter-frequency measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);

- perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.9.3 Inter-RAT measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- begin or continue monitoring cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11);
- perform measurements on other systems according to the IE "FACH measurement occasion info".

8.4.1.9.4 Traffic volume measurement

Upon transition from idle mode to CELL_FACH state, the UE shall:

- store the measurement control information from the IE "Traffic volume measurements system information" received in System Information Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) in the variable MEASUREMENT_IDENTITY;
- begin traffic volume measurement reporting according to the assigned information.

8.4.1.9.5 UE positioning measurement

Upon transition from idle mode to CELL_FACH state, the UE may:

- begin or continue monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5 according to subclause 8.1.1.6.15;
- if the IE "UE positioning OTDOA neighbour cell list for UE assisted" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED or
- if the IE "UE positioning OTDOA neighbour cell list for UE based" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED contains neighbour cells on other frequencies than the current frequency:
  - perform measurements on other frequencies according to the IE "FACH measurement occasion info".

8.4.1.9a Measurements after transition from connected mode to idle mode

Upon transition from connected mode to idle mode the UE shall:

- stop measurement reporting for all measurements stored in the variable MEASUREMENT_IDENTITY;
- clear the variable MEASUREMENT_IDENTITY;
- apply the following rules for different measurement types.

8.4.1.9a.1 Intra-frequency measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring intra-frequency cells listed in the IE "intra-frequency cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to subclause 8.1.1.6.11);
- begin monitoring intra-frequency cells listed in the IE "intra-frequency cell info list" received in System Information Block type 11.

8.4.1.9a.2 Inter-frequency measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring inter-frequency cells listed in the IE "inter-frequency cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to subclause 8.1.1.6.11);

- begin monitoring inter-frequency cells listed in the IE "inter-frequency cell info list" received in System Information Block type 11.

8.4.1.9a.3 Inter-RAT measurement

Upon transition from connected mode to idle mode, the UE shall:

- stop monitoring inter-RAT cells listed in the IE "inter-RAT cell info list" received in System Information Block type 12 (if System Information Block type 12 is transmitted in the cell, according to 8.1.1.6.11);
- begin monitoring inter-RAT cells listed in the IE "inter-RAT cell info list" received in System Information Block type 11.

8.4.1.9a.4 UE positioning measurement

Upon transition from connected mode to idle mode, the UE may:

- begin or continue monitoring assistance data received in System Information Block type 15 or System Information Block type 15.1 or System Information Block type 15.2 or System Information Block type 15.3 or System Information Block type 15.4 or System Information Block type 15.5;

8.4.1.10 Measurements when measurement object is no longer valid

8.4.1.10.1 Traffic volume measurement

If UE is no longer using the transport channel that is specified in the IE "Traffic volume measurement object", UE shall ignore any measurements that are assigned to that transport channel. If none of the transport channels that are specified in "traffic volume measurement object" is being used, UE shall delete that particular measurement and its measurement identity from the variable MEASUREMENT_IDENTITY.

8.4.2 Measurement report

Figure 58: Measurement report, normal case

8.4.2.1 General

The purpose of the measurement reporting procedure is to transfer measurement results from the UE to UTRAN.

8.4.2.2 Initiation

In CELL_DCH state, the UE shall transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are met for any ongoing measurements that are being performed in the UE.

In CELL_FACH state, the UE shall transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are met for any ongoing traffic volume measurement or UE positioning measurement that is being performed in the UE.

In TDD, if the Radio Bearer associated with the MEASUREMENT_IDENTITY fulfilling the reporting criteria for an ongoing traffic volume measurement is mapped on transport channel of type USCH, the UE shall initiate the "PUSCH CAPACITY REQUEST" procedure instead of transmitting a MEASUREMENT REPORT (TDD Only).

In CELL_PCH or URA_PCH state, the UE shall first perform the cell update procedure according to subclause 8.3.1, using the cause "uplink data transmission", in order to transit to CELL_FACH state and then transmit a MEASUREMENT REPORT message on the uplink DCCH when the reporting criteria stored in variable MEASUREMENT_IDENTITY are fulfilled for any ongoing traffic volume measurement or UE positioning measurement which is being performed in the UE.

The reporting criteria are fulfilled if either:

- the first measurement has been completed according to the requirements set in [19] or [20] for a newly initiated measurement with periodic reporting; or
- the time period indicated in the stored IE "Periodical reporting criteria" has elapsed since the last measurement report was submitted to lower layers for a given measurement; or
- an event in stored IE "Measurement reporting criteria" was triggered. Events and triggering of reports for different measurement types are described in detail in clause 14.

For the measurement, which triggered the MEASUREMENT REPORT message, the UE shall:

- set the IE "measurement identity" to the measurement identity, which is associated with that measurement in variable MEASUREMENT_IDENTITY;
- set the IE "measured results" to include measurements according to the IE "reporting quantity" of that measurement stored in variable MEASUREMENT_IDENTITY; and
  - if all the reporting quantities are set to "false":
    - not set the IE "measured results";
- set the IE "Measured results" in the IE "Additional measured results" according to the IE "reporting quantity" for all measurements associated with the measurement identities included in the IE "additional measurements" stored in variable MEASUREMENT_IDENTITY of the measurement that triggered the measurement report; and
  - if more than one additional measured results are to be included:
    - sort them in ascending order according to their IE "measurement identity" in the MEASUREMENT REPORT message;
- if the MEASUREMENT REPORT message was triggered by an event (i.e. not a periodical report):
  - set the IE "Event results" according to the event that triggered the report.

The UE shall:

- transmit the MEASUREMENT REPORT message on the uplink DCCH using either AM or UM RLC according to the stored IE "measurement reporting mode" associated with the measurement identity that triggered the report.

When the MEASUREMENT REPORT message has been submitted to lower layers for transmission:

- the procedure ends.

8.4.3 Assistance Data Delivery

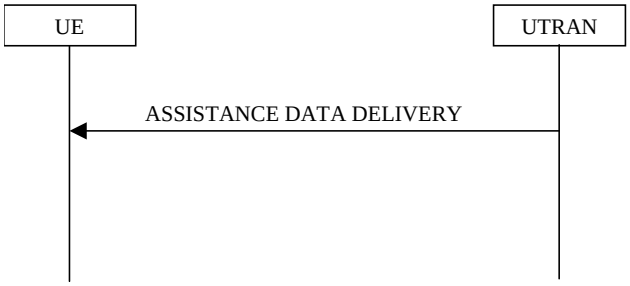

Figure 59 Assistance Data Delivery

8.4.3.1 General

The purpose of the assistance data delivery procedure is to transfer UE positioning related assistance data from the UTRAN to the UE.

8.4.3.2 Initiation

When requested by the Core Network the~~The~~ UTRAN may deliver UE positioning related assistance data with a ASSISTANCE DATA DELIVERY message, which is transmitted on the downlink DCCH using AM RLC

8.4.3.3 Reception of ASSISTANCE DATA DELIVERY message by the UE

Upon reception of a ASSISTANCE DATA DELIVERY message the UE shall:

- if IE "UE positioning OTDOA assistance data for UE-based" is included:
  - act as specified in subclause 8.6.7.19.2a;~~store the OTDOA assistance data;~~
  - if IE "UE positioning GPS assistance data" is included:
  - act as specified in subclause 8.6.7.19.3;~~store the GPS assistance data.~~

8.4.3.4 Invalid ASSISTANCE DATA DELIVERY message

If the UE receives a ASSISTANCE DATA DELIVERY message, which contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit an RRC STATUS message on the uplink DCCH using AM RLC;
- include the IE "Identification of received message"; and
- set the IE "Received message type" to ASSISTANCE DATA DELIVERY; and
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the ASSISTANCE DATA DELIVERY message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry;
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- when the RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid ASSISTANCE DATA DELIVERY message has not been received.

8.5.11 FACH measurement occasion calculation

When in CELL_FACH state and when the variable C_RNTI is non-empty the UE in FDD mode shall perform ~~inter-frequency and inter-system~~ measurements as specified in section 8.4.1.6 and 8.4.1.8 during the frame(s) with the SFN value fulfilling the following equation:

$$SFN \text{ div } N = C\_RNTI \bmod M\_REP + n * M\_REP$$

where

- N is the TTI (in number of 10ms frames) of the FACH having the largest TTI on the SCCPCH monitored by UE
- C_RNTI is the C-RNTI value of the UE stored in the variable C_RNTI
- M_REP is the Measurement Occasion cycle length. According to the equation above, a FACH Measurement Occasion of N frames will be repeated every N * M_REP frame, and $M\_REP = 2^k$.

  where,

  - k is the FACH Measurement occasion cycle length coefficient.
    The value of the FACH Measurement occasion cycle length coefficient is read in system information in "System Information Block type 11" or "System Information Block type 12" in the IE "FACH measurement occasion info".
- n = 0,1,2… as long as SFN is below its maximum value

The UE is allowed to measure on other occasions in case the UE moves "out of service" area or in case it can simultaneously perform the ordered measurements.

A UE in TDD mode shall use the frame(s) with the SFN value fulfilling the above equation for neighbour cells measurements.

8.6.7.1 Measurement validity

If the ~~optional~~ IE "measurement validity" for a given measurement has not been included in measurement control information, the UE shall delete the measurement associated with the variable MEASUREMENT_IDENTITY after the UE makes a transition to a new state.

If the IE "measurement validity" for this measurement has been included in measurement control information, the UE shall save the measurement associated with the variable MEASUREMENT_IDENTITY. The IE "UE state" defines the scope of resuming the measurement.

If the "UE state" is defined as "all states", the UE shall continue the measurement after making a transition to a new state. This scope is assigned ~~only~~ for traffic volume ~~type~~ measurement~~s~~ type and and UE positioning measurement type. For traffic volume measurement type this scope can only be applied by the UE if the IE " traffic volume measurement object" has been included in measurement control information. If the IE " traffic volume measurement object" has not been included in measurement control information, the UE shall not save the measurement control information in variable MEASUREMENT_IDENTITY, but shall send a MEASUREMENT CONTROL FAILURE message to the UTRAN with failure cause "Configuration incomplete".

If the "UE state" is defined as "all states except CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition from CELL_DCH state to any of the other states in connected mode. This scope is assigned ~~only~~ for traffic volume ~~type~~ measurement~~s~~ or UE positioning measurement type.

If the "UE state" is defined as "CELL_DCH", the UE shall store the measurement to be resumed after a subsequent transition to CELL_DCH state. After cell re-selection, the UE shall delete any ongoing intra-frequency or inter-frequency and inter-RAT type measurement associated with the variable MEASUREMENT_IDENTITY. Other measurement types shall, however, be continued regardless of cell reselection.

8.6.7.18a UE positioning measurement

If IE "UE positioning measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "UE positioning reporting quantity" or "CHOICE report criteria" is not received, the UE shall:

- clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT_IDENTITY;
- set the variable CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19 UE positioning

8.6.7.19.0 UE positioning reporting criteria

If IE “UE positioning reporting criteria” is included, the UE shall,

- perform the necessary measurements and evaluate the event in the interval indicated in IE “Measurement Interval”;
- If IE “Event ID” is set to “7a” and if IE “Report first fix” is set to TRUE,
  - if the IE "Method Type" included in the variable MEASUREMENT_IDENTITY is set to "UE based":
    - act as specified in section 8.6.7.19.1b;

8.6.7.19.1 UE positioning reporting quantity

The UE shall:

- ignore IE "Multiple Sets";
- ignore IE "Response Time";
- if IE "Horizontal Accuracy" and/or IE "Vertical Accuracy" is included:
  - should try to achieve the requested level(s) of positioning accuracy with 67% confidence;
- if IE "Positioning Methods" is set to "Cell ID":
  - ~~perform the Rx-Tx time difference type 2 measurement on the reference cell indicated in the OTDOA assistance data;~~act as specified in section 8.6.7.19.1a;
- if the IE "Method Type" is set to "UE based":
  - act as specified in section 8.6.7.19.1b;
  - ~~if the IE "Positioning Methods" is set to "GPS":~~
    - ~~when a measurement report is triggered:~~
      - ~~include the IE "UE positioning position estimate info" in the measurement report and set the contents of the IE as follows:~~
        - ~~if the UE supports the capability to provide the GPS timing of the cell, and~~
        - ~~if the IE "GPS timing of Cell wanted" is set to true:~~
          - ~~include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and~~
          - ~~include the IE "Reference SFN", the IE "GPS TOW msec"; and~~
          - ~~the UE may include the IE "GPS TOW rem usec";~~
  - ~~if the IE "Positioning Methods" is set to "OTDOA":~~
    - ~~when a measurement report is triggered:~~
      - ~~include the IE "UE positioning position estimate info" in the measurement report;~~
- if the IE "Method Type" is set to "UE assisted":
  - act as specified in section 8.6.7.19.1a~~if the IE "Positioning Methods" is set to "GPS":~~
    - ~~when a measurement report is triggered:~~
      - ~~include the IE "UE positioning GPS measured results" in the measurement report and set the contents of the IE as follows:~~

~~- if the UE supports the capability to provide the GPS timing of the cell, and~~

~~- if the IE "GPS timing of Cell wanted" is set to true:~~

~~- include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and~~

~~- include the IE "Reference SFN", the IE "GPS TOW msec"; and~~

~~- the UE may include the IE "GPS TOW rem usec";~~

~~- if the UE does not support the capability to provide the GPS timing of the cell:~~

~~- include the IE "GPS TOW msec";~~

~~- if the IE "Positioning Methods" is set to "OTDOA":~~

~~- when a measurement report is triggered:~~

~~- include the IE "UE positioning OTDOA measured results" in the measurement report.~~

- if the IE “Method Type” is set to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”:

  - act either according to section 8.6.7.19.1a or 8.6.7.19.1b depending on the method type chosen by the UE.

If UE according to its capabilities supports Rx-Tx time difference type 2 measurement and if IE "Positioning Methods" is set to "Cell ID" and the IE "Measurement validity" stored in the variable MEASUREMENT_IDENTITY is other than "CELL_DCH", the UE shall:

- set the variable CONFIGURATION_INCOMPLETE to TRUE, and

- act as specified in subclause 8.4.1.4b.

The UE shall perform the following consistency check:

- if UE, according to its capabilities, does not support UE based OTDOA and if IE "Positioning Methods" is set to "OTDOA" and if IE "Method Type" is set to "UE based":

  - set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~;

- if UE, according to its capabilities, does not support UE based GPS and if IE "Positioning Methods" is set to "GPS" and if IE "Method Type" is set to "UE based":

  - set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~;

- if UE, according to its capabilities, does not support UE assisted GPS and if IE "Positioning Methods" is set to "GPS" and if IE "Method Type" is set to "UE assisted":

  - set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~;

- if UE, according to its capabilities, does not support UE based positioning and if IE "Positioning Methods" is set to "OTDOAorGPS" and if IE "Method Type" is set to "UE based":

  - set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~;

- if UE, according to its capabilities, does not support Rx-Tx time difference type 2 measurement and if IE "Positioning Methods" is set to "Cell ID":

  - set the variable CONFIGURATION_INCOMPLETE to TRUE~~act as specified in subclause 8.4.1.4~~.

8.6.7.19.1a UE positioning reporting for UE assisted methods

When a measurement report is triggered, and

- if higher layers indicated that the positioning request is permitted and

- if the UE was able to perform measurements on at least one neighbour cell in case of OTDOA or one satellite in case of GPS positioning, respectively, the UE shall
  - if the IE "Vertical Accuracy" is included:
    - interpret the presence of this IE to indicate that the UTRAN desires to compute a 3-dimensional position estimate.
  - if the IE "Positioning Methods" is set to "GPS":
    - include the IE "UE positioning GPS measured results" in the measurement report and set the contents of the IE as follows:
      - if the UE supports the capability to provide the GPS timing of the cell frames measurement, and
        - if the IE "GPS timing of Cell wanted" is set to TRUE:
          - perform the UE GPS timing of cell frames measurement on the reference cell indicated in the IE “UE positioning GPS reference cell info”;
          - if the UE is unable to measure the GPS timing of cell frames of the reference cell indicated in the IE “UE positioning GPS reference cell info”:
            - perform the UE GPS timing of cell frames measurement on the serving cell or on one cell of the active set;
          - include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD; and
          - include the IE "Reference SFN" and the IE "UE GPS timing of cell frames";
      - if the UE does not support the capability to provide the GPS timing of the cell, or
      - if the IE "GPS timing of Cell wanted" is set to FALSE:
        - include the IE "GPS TOW msec";
  - if the IE "Positioning Methods" is set to "OTDOA":
    - include the IE "UE positioning OTDOA measured results " in the measurement report and set the contents of the IE as follows:
      - set IE “SFN” to the SFN when the last measurement was performed
      - if the UE supports the capability to perform the Rx-Tx time difference type 2 measurement, and
        - if the UE is in CELL_DCH state:
          - if the measured value is equal to “1279.9375”:
            - set the IE “Rx-Tx time difference type 2” in IE “UE positioning OTDOA measured results” for the reference cell to “1279.8750”;
          - otherwise:
          - set the IE “Rx-Tx time difference type 2” in IE “UE positioning OTDOA measured results” for the reference cell to the measured value;
          - include the IE group “Rx-Tx time difference type 2 info” for the reference cell and for each neighbour cell listed in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED that belongs to the active set;
      - if the UE does not support the capability to perform the Rx-Tx time difference type 2 measurement:
        - set the IE “Rx-Tx time difference type 2” in IE “UE positioning OTDOA measured results” for the reference cell to value “1279.9375” to indicate that the measurement is not supported;

- include IE group “Neighbour” for all neighbour cells listed in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED on which the SFN-SFN observed time difference type 2 measurement could be performed;

- if IE “Positioning Methods” in the MEASUREMENT CONTROL message has been assigned to value “OTDOA or GPS”:

- the UE may choose to either act as if IE “Positioning Methods”is set to “GPS” or “OTDOA” depending on the method chosen by the UE.

- if the IE "Positioning Methods" is set to "CELL ID":

- if the UE supports the capability to perform the Rx-Tx time difference type 2 measurement, and

- if the UE is in CELL_DCH state:

- perform the Rx-Tx time difference type 2 measurement on the reference cell indicated in the IE "UE positioning OTDOA assistance data", and

- report the measurement results back to the network in the MEASUREMENT REPORT by using IE “UE positioning OTDOA measured results” excluding any measurements on neighbour cells in this IE

- if the UE is not able to report the requestedmeasurement results, or

- if higher layers have indicated that the positioning request is not permitted, or

- if the positioning request was not processed by higher layers and timed out,

- include IE “UE positioning error” in the MEASUREMENT REPORT and set the contents of this IE as specifiefied in section 8.6.7.19.5

8.6.7.19.1b UE positioning reporting for UE based methods

When a measurement report is triggered and

- if higher layers indicated that the positioning request is permitted and

- and if the UE has been able to calculate a position, the UE shall

- include IE “UE positioning Position Estimate Info” in the MEASUREMENT REPORT and set the contents of the IE as follows:

- if the UE supports the capability to perform the UE GPS timing of cell frames measurement and UTRAN has requested to report the GPS timing of cell frames, the UE shall

- perform the UE GPS timing of cell frames measurement on the reference cell indicated in the IE “UE positioning GPS reference cell info”

- if the UE is unable to measure the GPS timing of cell frames of the reference cell indicated in the IE “UE positioning GPS reference cell info”:

- perform the UE GPS timing of cell frames measurement on the serving cell or on one cell of the active set.

- include the IE "Primary CPICH Info" for FDD or the IE "cell parameters id" for TDD;

- include the SFN when the position was determined;

- include the IE “UE GPS timing of cell frames”;

- if the UE does not supports the capability to perform the UE GPS timing of cell frames measurement, or

- if the IE "GPS timing of Cell wanted" is set to FALSE, the UE shall

- include the IE “GPS TOW msec”;

- if IE “Vertical Accuracy” has been included in IE “UE positioning reporting quantity” and
  - if the IE “Vertical Accuracy” has been assigned to value “0” and
    - if the IE “Horizontal Accuracy” has been assigned a value “0”, the UE may
      - include IE “Ellipsoid point with altitude”;
    - if the IE “Horizontal Accuracy” has been assigned a value unequal to “0” and
    - if the UE has been able to calculate a 3-dimensional position, the UE shall
      - include IE “Ellipsoid point with altitude” or IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate;
    - if the UE has not been able to calculate a 3-dimensional position, the UE may
      - act as if IE “Vertical Accuracy” was not included in IE “UE positioning reporting quantity”;
  - if the IE “Vertical Accuracy” has been assigned to a value unequal to “0” and
    - if the UE has been able to calculate a 3-dimensional position, the UE shall
      - include IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate;
    - if the UE has not been able to calculate a 3-dimensional position, the UE shall
      - act as if IE “Vertical Accuracy” has not been included in IE “UE positioning reporting quantity”;
- if IE “Vertical Accuracy” has not been included in IE “UE positioning reporting quantity” and
  - if IE “Horizontal Accuracy” in IE “UE positioning reporting quantity” has been assigned to value “0”, the UE may:
    - include IE “Ellipsoid point”;
  - if IE “Horizontal Accuracy” in IE “UE positioning reporting quantity” has been assigned to a value unequal to 0, the UE shall
    - include either IE “Ellipsoid point with uncertainty circle” or IE “Ellipsoid point with uncertainty ellipse” or IE “Ellipsoid point with altitude and uncertainty ellipsoid” as the position estimate.

- if the UE was not able to calculate a position, or
- if higher layers have indicated that the positioning request is not permitted, or
  - if the positioning request was not processed by higher layers and timed out, - include IE “UE positioning error” in the MEASUREMENT REPORT and set the contents of this IE as specifiefied in section 8.6.7.19.5

8.6.7.19.2 UE positioning OTDOA assistance data for UE-assisted

If IE "UE positioning OTDOA reference cell info for UE-assisted " is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the UE positioning reference cell info in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED, overwriting any existing information.

If IE "UE positioning OTDOA neighbour cell list for UE assisted " is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the neighbour cell info list in the variable ~~CELL_INFO_LIST~~ UE_POSITIONING_OTDOA_DATA_UE_ASSISTED, overwriting any existing information.

If, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells, the UE shall:

- ignore this IE.

If IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message, the UE shall also perform the following consistency checks:

- if IE "Positioning Methods" is set to "OTDOA" or "Cell ID":
  - if IE "UE positioning OTDOA reference cell info for UE assisted " is not included and if UE positioning OTDOA reference cell info in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED is empty:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA neighbour cell list for UE assisted " is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;

~~if IE "Method Type" is set to "UE based":~~

~~if IE "UE positioning OTDOA reference cell info" is included and if IE "Cell Position" for the reference cell is not included:~~

~~set the variable CONFIGURATION_INCOMPLETE to TRUE;~~

~~if the IE "UE positioning OTDOA neighbour cell list" is included and if cell position of less than two neighbour cells of the cells included in this IE and stored in variable UE_POSITIONING_OTDOA_DATA are different and if those cell positions are not different to the one of the reference cell stored in variable UE_POSITIONING_OTDOA_DATA:~~

~~set the variable CONFIGURATION_INCOMPLETE to TRUE;~~

~~if the IE "UE positioning OTDOA neighbouring cell list" is included and only two neighbour cells are included or stored in variable UE_POSITIONING_OTDOA_DATA and if the IE "Round Trip Time" is neither included for the neighbour cells nor for the reference cell info:~~

~~set the variable CONFIGURATION_INCOMPLETE to TRUE.~~

8.6.7.19.2a UE positioning OTDOA assistance data for UE-based

If IE "UE positioning OTDOA reference cell info for UE-based" is received in System Information Block type 15.5 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly. The UE shall:

- store received cell information in the UE positioning reference cell info for UE based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

If IE "UE positioning OTDOA neighbour cell list for UE based" is received in System Information Block type 15.5 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly. The UE shall:

- store received cell information in the neighbour cell info list for UE based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

If, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells, the UE shall:

- ignore this IE.

If IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message, the UE shall also perform the following consistency checks:

- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA reference cell info for UE based" is not included and if UE positioning OTDOA reference cell info for UE based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED is empty:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA neighbour cell list for UE based" is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list for UE based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE;
  - if IE "Method Type" is set to "UE based":
    - if IE "UE positioning OTDOA reference cell info for UE based" is included and if IE "Cell Position" for the reference cell is not included:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE;
    - if the IE "UE positioning OTDOA neighbour cell list for UE based" is included and if cell position of less than two neighbour cells of the cells included in this IE and stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED are different and if those cell positions are not different to the one of the reference cell stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE;
    - if the IE "UE positioning OTDOA neighbouring cell list for UE-based " is included and only two neighbour cells are included or stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED and if the IE "Round Trip Time" is neither included for the neighbour cells nor for the reference cell info:
      - set the variable CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19.3 UE positioning GPS assistance data

The UE may receive GPS assistance data in System Information Block types 15, 15.1, 15.2, or 15.3, or in the ASSISTANCE DATA DELIVERY message, or in the MEASUREMENT CONTROL message.

8.6.7.19.3.1 UE positioning GPS acquisition assistance

If the IE "UE positioning GPS acquisition assistance" is included, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:
  - delete all information currently stored in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA;
  - store the received acquisition assistance information in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA;
  - store the IE "GPS TOW msec" in the IE "UE positioning GPS acquisition assistance" in variable UE_POSITIONING_GPS_DATA anduse it as an estimate of the current GPS Time-of-Week;
- if the IEs "SFN"and "UTRAN GPS timing of cell frames" are included:
  - if the UE is able to utilise these IEs:

- store these IEs in the IE "UE positioning GPS acquisition assistance " in variable UE_POSITIONING_GPS_DATA;
- if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not included and
  - if the UE is not in CELL_DCH state:
    - use IEs “SFN” and “UTRAN GPS timing of cell frames” to estimate the relationship between GPS time and radiointerface timing of the NODE B transmission in the serving cell;
  - if the UE is in CELL_DCH state:
    - ignore IEs “SFN” and “UTRAN GPS timing of cell frames”;
- if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:
  - store this IE in the IE “UE positioning acquisition assistance” in variable UE_POSITIONING_GPS_DATA;
  - use IEs “SFN” and “UTRAN GPS timing of cell frames” to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";

~~- store IE "GPS reference time" in the IE "UE positioning reference time" in UE_POSITIONING_GPS_DATA;~~

~~- for each satellite:~~

~~- update the variable UE_POSITIONING_GPS_DATA as follows:~~

~~- store received GPS acquisition assistance at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS acquisition assistance" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position.~~

8.6.7.19.3.2 UE positioning GPS Almanac

If the IE "UE positioning GPS Almanac" is included, ~~for each satellite~~, the UE shall:

- if the IE “SV Global Health” is included:
  - store this IE in the IE in the IE “SV Global Health” in the IE “UE positioning GPS Almanac” in variable UE_POSITIONING_GPS_DATA.
- for each satellite:
  - store received GPS almanac information at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS Almanac" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position. [changed indentation]
  - interpret IE "Data ID" as the Data ID field contained in the indicated subframe, word 3, most significant 2 bits, as defined by [12];
  - act on the rest of the IEs in a similar manner as specified in [12].

~~- update the variable UE_POSITIONING_GPS_DATA as follows:~~

- store received GPS almanac information at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS Almanac" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position.
- interpret IE "Data ID" as the Data ID field contained in the indicated subframe, word 3, most significant 2 bits, as defined by [12];
- act on the rest of the IEs in a similar manner as specified in [12].

8.6.7.19.3.3 UE positioning D-GPS Corrections

If the IE "UE positioning GPS DGPS corrections" is included, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:
  - delete all information currently stored in the IE "UE positioning GPS DGPS corrections" in the variable UE_POSITIONING_GPS_DATA; [changed indentation]
  - store the received DGPS corrections in the IE "UE positioning GPS DGPS corrections" in the variable UE_POSITIONING_GPS_DATA. [changed indentation]
- use IE "GPS TOW sec" to determine when the differential corrections were calculated;
- use IE "Status/Health" to determine the status of the differential corrections;

8.6.7.19.3.3a UE positioning GPS Navigation Model

If the IE “UE positioning GPS Navigation Model” is included, for each satellite, the UE shall:

- use IE "Satellite Status” to determine if an update of IE “UE positioning GPS Ephemeris and Clock Correction parameters” has been provided for the satellite indicated by the IE “SatID”;
- if an update has been provided for this satellite
  - act as specified in subclause 8.6.7.19.3.4.

8.6.7.19.3.4 UE positioning GPS Ephemeris and Clock Correction Parameters

If the IE "UE positioning GPS Ephemeris and Clock Correction parameters" is included, for each satellite, the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows:
  - store this IE ~~received GPS ephemeris information~~ at the position indicated by the IE "Sat ID" in the IE "UE positioning GPS Navigation Model" in the variable UE_POSITIONING_GPS_DATA, possibly overwriting any existing information in this position.
- act on these GPS ephemeris and clock correction parameters in a manner similar to that specified in [12].

8.6.7.19.3.5 UE positioning GPS ionospheric model

If IE "UE positioning GPS ionospheric model" is included, the UE shall:

- store this IE in the IE "UE positioning GPS ionospheric model" in variable UE_POSITIONING_GPS_DATA
- act on these GPS ionospheric model parameters in a manner similar to that specified in [12].~~.~~

8.6.7.19.3.6 UE positioning GPS real-time integrity

~~The GPS real-time integrity information element specified in subclause 10.3.7.95 is primarily intended for non-differential applications. The real-time integrity of the satellite constellation is of importance as there is no differential correction data by which the UE can determine the soundness of each satellite signal. The Real-Time GPS Satellite Integrity data communicates the health of the constellation to the mobile via a list of bad satellites. The UE shall consider the data associated with the satellites identified in this IE as invalid.~~

If this list of bad satellites is included, ~~for each satellite,~~ the UE shall:

- update the variable UE_POSITIONING_GPS_DATA as follows
  - add the Sat IDs that are not yet included in the list of satellites in the IE "UE positioning GPS real time integrity" in the variable UE_POSITIONING_GPS_DATA; [changed indentation]
  - remove all Sat IDs in the list of satellites in the IE "UE positioning GPS real time integrity" in the variable UE_POSITIONING_GPS_DATA that are not included in IE UE positioning GPS real time integrity. [changed indentation]

- consider the data associated with the satellites identified in the variable UE_POSITIONING_GPS_DATA as invalid.

8.6.7.19.3.7 UE positioning GPS reference time

If the IE "UE positioning GPS reference time" is included, the UE shall:

- store ~~this~~ IE "GPS Week" in "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA and use it as the current GPS week;
- store the IE "GPS TOW msec" in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA anduse it as an estimate of the current GPS Time-of-Week;
- if the IE “SFN”and IE “UTRAN GPS timing of cell frames” are included:
  - if the UE is able to utilise the IEs:
    - store these IEs in the IE "UE positioning GPS reference time" in variable UE_POSITIONING_GPS_DATA;
    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is not includedand
      - if the UE is not in CELL_DCH state:
        - use IEs “SFN” and “UTRAN GPS timing of cell frames” to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the serving cell;
      - if the UE is in CELL_DCH state:
        - ignore IEs “SFN” and “UTRAN GPS timing of cell frames”;
    - if the IE "Primary CPICH Info" for FDD or IE "cell parameters id" for TDD is also included:
      - store this IE in the IE “UE positioning GPS reference time” in variable UE_POSITIONING_GPS_DATA;
      - use IEs “SFN” and “UTRAN GPS timing of cell frames” to estimate the relationship between GPS time and air-interface timing of the NODE B transmission in the cell indicated by "Primary CPICH info" or "cell parameters id";
- if the IE “SFN-TOW Uncertainty” is included:
  - store this IE in the IE “UE positioning GPS reference time” in variable UE_POSITIONING_GPS_DATA and use it to determine if the relationship between GPS time and air-interface timing of the NODE B transmission is known to within at least 10ms;
- if the IE “$T_{UTRAN-GPS}$ drift rate” is included:
  - store this IE in the IE “UE positioning GPS reference time” in variable UE_POSITIONING_GPS_DATA and
  - may use it as an estimate of the drift rate of the NODE B clock relative to GPS time;
- if the IE “GPS TOW Assist” is included:
  - for each satellite: [indentation changed]
    - delete all information currently stored in the IE “GPS TOW Assist” ~~store received GPS TOW assist at the position indicated by the IE "Sat ID"~~ in the IE "UE positioning GPS reference time" in the variable UE_POSITIONING_GPS_DATA,~~ possibly overwriting any existing information in this position.~~ [indentation changed]
    - store the received GPS TOW Assist information in the IE “UE positioning GPS reference time” in the variable UE_POSITIONING_GPS_DATA.

8.6.7.19.3.8 UE positioning GPS reference UE position

If the IE "UE positioning GPS reference UE position" is included, the UE shall:

- store this IE in the IE "UE positioning GPS reference UE position" in variable UE_POSITIONING_GPS_DATA, and.
- use it as a priori knowledge of the approximate location of the UE.

8.6.7.19.3.9 UE positioning UTC model

If the IE "UE positioning GPS UTC model" is included, the UE shall:

- store this IE in the IE "UE positioning GPS UTC model" in variable UE_POSITIONING_GPS_DATA.

8.6.7.20 Void8.6.7.19.4UE positioning Ciphering info

If deciphering information is received from higher layers for deciphering of GPS assistance data broadcast on system information, the UE shall:

- store the current key in IE “Current deciphering key” in variable UE_POSITIONING_GPS_DATA;
- store the next key in IE “Next deciphering key” in variable UE_POSITIONING_GPS_DATA;
- store the ciphering key flag in UE_POSITIONING_GPS_DATA.

If deciphering information is received from higher layers for deciphering of OTDOA assistance data broadcast on system information, the UE shall:

- store the current key in IE “Current deciphering key” in variable UE_POSITIONING_OTDOA_DATA_UE_BASED;
- store the next key in IE “Next deciphering key” in variable UE_POSITIONING_OTDOA_DATA_UE_BASED;
- store the ciphering key flag in UE_POSITIONING_OTDOA_DATA_UE_BASED.

If the IE "GPS Data ciphering info" is included in SIB15, the UE shall:

- select one of the two deciphering keys received and store it in UE_POSITIONING_GPS_DATA according to the following:
  - if the value of the received IE "Ciphering Key Flag" is the same as the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_GPS_DATA:
    - select the current deciphering key;
  - if the value of the received IE "Ciphering Key Flag" is different from the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_GPS_DATA:
    - select the next deciphering key;
- store the received IE in the variable UE_POSITIONING_GPS_DATA;
- use the selected deciphering key to decipher the broadcast UE positioning GPS information contained within the System Information Block types 15.1, 15.2 and 15.3.

If the IE "OTDOA positioning ciphering info" is included in SIB15.4, the UE shall:

- select one of the two deciphering keys and store it in UE_POSITIONING_OTDOA_DATA_UE_BASED according to the following:
  - if the value of the received IE "Ciphering Key Flag" is the same as the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED:
    - select the current deciphering key;

- if the value of the received IE "Ciphering Key Flag" is different from the value of the IE "Ciphering Key Flag" stored in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED:

  - select the next deciphering key;

- store the received IE in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED;

- use the selected deciphering key to decipher the IE "OTDOA assistance data" included in the System Information Block types 15.4.

8.6.7.19.5 UE positioning Error

The UE shall set the contents of the IE "UE positioning Error" as follows:

- if the IE “Positioning Methods” in IE “UE positioning reporting quantity” has been assigned to value “OTDOA” and no neighbour cells could be received,

  - set IE “Error reason” to “ER1”;

- if the IE “Positioning Methods” in IE “UE positioning reporting quantity” has been assigned to value “GPS” and

  - if there were not enough GPS satellites to be received,

    - set IE “Error reason” to “ER2”;

  - if some GPS assistance data was missing,

    - set IE “Error reason” to “ER3”, and

    - if the IE ""Additional Assistance Data Request" included in the IE "UE positioning reporting quantity" stored in the variable MEASUREMENT_IDENTITY is set to TRUE;

      - include the IE GPS Additional Assistance Data Request"

  - if the UE was not able to read the SFN of the reference cell included in the IE "UE positioning GPS reference time" or in the IE “UE positioning acquisition assistance”,

    - set IE “Error reason” to “ER7”;

  - if the UE was not able to measure the requested GPS timing of cell frames measurement,

    - set IE “Error reason” to “ER8”;

- if higher layers have indicated that the positioning request is not permitted,

  - set IE “Error reason” to “ER5”

- if the positioning request was not processed by higher layers and timed out,,

  - set IE “Error reason” to “ER6”

- if none of the conditions above are fulfilled,

  - set IE "Error reason" to "ER4"

8.6.7.19.6 UE positioning GPS reference cell info

If IE "UE positioning GPS reference cell info" is received in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_GPS_DATA accordingly. The UE shall:

- store received reference cell information in the IE “UE positioning GPS reference cell info” in the variable UE_POSITIONING_GPS_DATA, overwriting any existing information.

8.6.7.21 Intra-frequency reporting quantity for RACH reporting

If the IE " Intra-frequency reporting quantity for RACH reporting" is included, the UE shall:

- if the IE "SFN-SFN observed time difference reporting indicator" has the value "type 2":
  - act as if the value of the IE "SFN-SFN observed time difference reporting indicator" is "no reporting".

10.2.4 ASSISTANCE DATA DELIVERY

This message is sent by UTRAN to convey UE positioning assistance data to the UE.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Measurement Information elements				
UE positioning OTDOA assistance data for UE-based	OP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	
UE positioning GPS assistance data	OP		UE positioning GPS assistance data 10.3.7.90	

10.2.48.8.18 System Information Block type 15

The system information block type 15 contains information useful for UE-based or UE-assisted positioning methods.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Data ciphering info	OP		UE positioning Cipher info 10.3.7.86	If this IE is present then the SIB types 15.1, 15.2 & 15.3 are ciphered in accordance with the Data Assistance Ciphering Algorithm specified in [18]
Reference position	MP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	approximate position where the UE is located
GPS reference time	MP		UE positioning GPS reference time 10.3.7.96	
Satellite information	OP	1 to <maxSat>		This IE is present whenever bad (failed/failing) satellites are detected by UTRAN [18].
>BadSatID	MP		Enumerated(0..63)	

10.2.48.8.18.1 System Information Block type 15.1

The system information block type 15.1 contains information useful for UE positioning DGPS Corrections. The DGPS Corrections message contents are based on a Type-1 message of DGPS specified in [13].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
DGPS corrections	MP		UE positioning GPS DGPS corrections 10.3.7.91	

10.2.48.8.18.2 System Information Block type 15.2

The system information block type 15.2 contains information useful for GPS Navigation Model. These IE fields are based on information extracted from the subframes 1 to 3 of the GPS navigation message [12].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Transmission TOW	MP		Integer (0..604799)	The approximate GPS time-of-week when the message is broadcast. in seconds
SatID	MP		Enumerated(0..63)	Satellite ID
GPS Ephemeris and Clock Correction Parameters	MP		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	

10.2.48.8.18.3 System Information Block type 15.3

The system information block type 15.3 contains information useful for ionospheric delay, UTC offset, and Almanac. These IEs contain information extracted from the subframes 4 and 5 of the GPS navigation message, [12].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Transmission TOW	MP		Integer (0..604799)	The approximate GPS time-of-week when the message is broadcast. in seconds
GPS Almanac and Satellite Health	OP		UE positioning GPS almanac 10.3.7.89	
GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
SatMask	CV-*Almanac*		Bit string(1..32)	indicates the satellites that contain the pages being broadcast in this data set
LSB TOW	CV-*Almanac*		Bit string(8)	

Condition	Explanation
Almanac	This IE is mandatory present if the IE "GPS Almanac and Satellite Health" is present

10.2.48.8.18.4 System Information Block type 15.4

The system information block type 15.4 contains ciphering information for SIB 15.5 and information useful for ~~OTDOA based~~ UE-assisted OTDOA Positioning method.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
OTDOA Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	If this IE is present then the the System Information Block 15.5 ~~IE "OTDOA Assistance Data"~~ is ciphered in accordance with the Data Assistance Ciphering Algorithm specified in [18]
OTDOA assistance data for UE-assisted	MP		UE positioning OTDOA assistance data for UE-assisted 10.3.7.103	

10.2.48.8.18.4a System Information Block type 15.5

The system information block type 15.5 contains information useful for OTDOA based UE Positioning method.

Information Element/Group name	**Need**	**Multi**	**Type and Reference**	**Semantics description**
OTDOA assistance data for UE-based	MP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	

10.3.3.45 UE positioning capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Standalone location method(s) supported	MP		Boolean	Defines if a UE can measure its location by some means unrelated to UTRAN TRUE means supported
UE based OTDOA supported	MP		Boolean	TRUE means supported
Network Assisted GPS support	MP		Enumerated ('Network based', 'UE based', 'Both', 'None')	Defines if the UE supports network based or UE based GPS methods.
Support for UE GPS timing of cell frames measurement~~GPS reference time capable~~	MP		Boolean	Defines if a UE has the capability to perform the UE GPS timing of cell frames measurement ~~measure GPS reference time as defined in~~ [7]. TRUE means capable
Support for IPDL	MP		Boolean	Defines if a UE has the capability to use IPDL to enhance its 'SFN-SFN observed time difference –type 2' measurement. TRUE means supported
Support for Rx-Tx time difference type2 measurement	MP		Boolean	TRUE means supported

10.3.7.51 Measurement validity

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE state	MP		Enumerated(CELL_DCH, all states except CELL_DCH, all states)	~~Indicates the states, in which measurement reporting shall be conducted.~~ ~~The values 'all states except CELL_DCH' and 'all states' are used for measurement type 'traffic volume reporting'.~~

10.3.7.86 UE positioning Ciphering info

This IE contains information for the ciphering of UE positioning assistance data broadcast in System Information.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Ciphering Key Flag	MP		Bit string(1)	~~See note 1~~
Ciphering Serial Number	MP		Integer(0..65 535)	The serial number used in the DES ciphering algorithm

~~NOTE 1: The UE always receives two (2) cipher keys during the location update procedure. One of the keys is time-stamped to be current one and the other is time-stamped to be the next one. Thus, the UE always has two cipher keys in memory. The Cipher Key Change Indicator in this broadcast message instructs the UE whether to use current or next cipher key for deciphering the received broadcast message. The UE shall interpret this IE as follows:~~

~~- **Ciphering Key Flag**(previous message) = **Ciphering Key Flag**(this message) => Deciphering Key not changed~~

~~- **Ciphering Key Flag**(previous message) <> **Ciphering Key Flag**(this message) => Deciphering Key changed~~

10.3.7.87 UE positioning Error

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Error reason	MP		Enumerated(ER1, ER2, ER3, ER4, ER5, ER6, ER7, ER8)	Note 1
GPS Additional Assistance Data Request	OP		UE positioning GPS Additional Assistance Data Request 10.3.7.88a	

NOTE 1: The following table gives the mapping of the IE "Error reason"

Value	Indication
ER1	There were not enough cells to be received ~~when performing mobile-based OTDOA-IPDL.~~
ER2	There were not enough GPS satellites to be received~~, when performing UE-based GPS location.~~
ER3	~~Location calculation~~ UE Positioning assistance data missing.
~~ER4~~	~~Requested method not supported.~~
ER4~~5~~	Undefined error.
ER5~~6~~	~~Location~~ UE positioning request denied by ~~the user.~~upper layers
ER6~~7~~	UE positioning~~Location~~ request not processed by ~~the user~~ upper layers and timeout
ER7~~8~~	UE was not able to read the SFN of the reference cell~~Reference cell for GPS is not the serving cell~~
ER8	UE was not able to accomplish the GPS timing of cell frames measurement.

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds)rounded down to the nearest millisecond unit
~~CHOICE *Reference Time*~~	~~MP~~			
~~>~~UTRAN reference time	OP			~~GPS Time of Week counted in microseconds, given as GPS TOW in milliseconds and GPS TOW remainder in microseconds, UTRAN reference time = 1000 * GPS TOW msec + GPS TOW rem usec~~
>UTRAN GPS timing of cell frames	MP		Integer(0 ... 2322431999999)	GPS timing of cell frames in steps of 1chip
~~>>GPS TOW msec~~	~~MP~~		~~Integer(0..6.048*10^8-1)~~	~~GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit)~~
~~>>GPS TOW rem usec~~	~~MP~~		~~Integer(0..999)~~	~~GPS Time of Week in microseconds MOD 1000.~~
>~~>~~CHOICE *mode*				
>>~~>~~FDD				
>>>~~>~~Primary CPICH Info	MP~~OP~~		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>~~>~~TDD				
>>>~~>~~cell parameters id	MP~~OP~~		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>~~>~~SFN	MP		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames time stamps
~~>GPS reference time only~~				
~~>>GPS TOW msec~~	~~MP~~		~~Integer(0..6.048*10^8-1)~~	~~GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).~~
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0^{th} order term)	MP		Real(-5120..5117.5 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1^{st} order term)	MP		Real (-0.966..0.483 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50, 100,200)	Hz
>Code Phase	MP		Integer(0..1022)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023,1,2,3,4,6,8,12,16,24,32,48,64,96,128, 192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348.	Degrees

			75 by step of 11.25)	
>>Elevation	MP		Real(0..78.75 by step of 11.25)	Degrees

CHOICE *Reference time*	Condition under which the given *reference time* is chosen
UTRAN reference time	The reference time is relating GPS time to UTRAN time (SFN)
GPS reference time only	The time gives the time for which the location estimate is valid

10.3.7.88a UE positioning GPS Additional Assistance Data Request

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Almanac	MP		Boolean	TRUE means requested
UTC Model	MP		Boolean	TRUE means requested
Ionospheric model	MP		Boolean	TRUE means requested
Navigation Model	MP		Boolean	TRUE means requested
DGPS Corrections	MP		Boolean	TRUE means requested
Reference Location	MP		Boolean	TRUE means requested
Reference Time	MP		Boolean	TRUE means requested
Acquisition Assistance	MP		Boolean	TRUE means requested
Real-Time Integrity	MP		Boolean	TRUE means requested
Navigation Model Additional data	CV-*Navigation Model*			this IE is present only if "Navigation Model" is set to TRUE otherwise it is absent
>GPS Week	MP		Integer (0..1023)	
>GPS_Toe	MP		Integer (0..167)	GPS time of ephemeris in hours of the latest ephemeris set contained by the UE
>T-Toe limit	MP		Integer (0..10)	ephemeris age tolerance of the UE to UTRAN in hours
>Satellites list related data	MP	0 to <maxSat>		
>>SatID	MP		Integer (0..63)	
>>IODE	MP		Integer (0..255)	Issue of Data Ephemeris for SatID

10.3.7.89 UE positioning GPS almanac

This IE contains a reduced-precision subset of the ephemeris and clock correction parameters.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
WN_a	MP		Bit string(8)	
Satellite information	MP	1 to <maxSat>		
>DataID	MP		Integer(0..3)	See [12]
>SatID	MP		Enumerated(0..63)	Satellite ID
>e	MP		Bit string(16)	Eccentricity [12]
>t_{oa}	MP		Bit string(8)	Reference Time of Almanac~~Ephemeris~~ [12]
>δi	MP		Bit string(16)	
>OMEGADOT	MP		Bit string(16)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles/sec) [12]
>SV Health	MP		Bit string(8)	
>$A^{1/2}$	MP		Bit string(24)	Semi-Major Axis (meters)$^{1/2}$ [12]
>$OMEGA_0$	MP		Bit string(24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) [12]
>M_0	MP		Bit string(24)	Mean Anomaly at Reference Time (semi-circles) [12]
>ω	MP		Bit string(24)	Argument of Perigee (semi-circles) [12]
>af_0	MP		Bit string(11)	apparent clock correction [12]
>af_1	MP		Bit string(11)	apparent clock correction [12]
SV Global Health	OP		Bit string(364)	This enables GPS time recovery and possibly extended GPS correlation intervals. It is specified in page 25 of subframes 4 and 5 [12]

10.3.7.90 UE positioning GPS assistance data

This IE contains GPS assistance data.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning GPS reference time	OP		UE positioning GPS reference time 10.3.7.96	
UE positioning GPS reference UE position	OP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	A priori knowledge of UE 3-D position.
UE positioning GPS DGPS corrections	OP		UE positioning GPS DGPS corrections 10.3.7.91	
UE positioning GPS navigation model	OP		UE positioning GPS navigation model 10.3.7.94	
UE positioning GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
UE positioning GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
UE positioning GPS almanac	OP		UE positioning GPS almanac 10.3.7.89	
UE positioning GPS acquisition assistance	OP		UE positioning GPS acquisition assistance 10.3.7.88	
UE positioning GPS real-time integrity	OP		UE positioning GPS real-time integrity 10.3.7.95	
UE positioning GPS reference cell info	OP		UE positioning GPS reference cell info 10.3.7.95a	Identifies reference cell associated with request for UE GPS timing of cell frames measurement

10.3.7.90a Void

10.3.7.91 UE positioning GPS DGPS corrections

This IE contains DGPS corrections to be used by the UE.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW sec	MP		Integer(0..604799)	seconds GPS time-of-week when the DGPS corrections were calculated
Status/Health	MP		Enumerated(UDRE scale 1.0, UDRE scale 0.75, UDRE scale 0.5, UDRE scale 0.3, UDRE scale 0.2, UDRE scale 0.1, no data, invalid data)	
DGPS~~DPGS~~ information	CV-*Status/Health*	1 to <maxSat>		If the Cipher information is included these fields are ciphered.
>SatID	MP		Enumerated (0…63)	
>IODE	MP		Integer(0..255)	
>UDRE	MP		Enumerated(UDRE ≤ 1.0 m, 1.0m < UDRE ≤ 4.0m, 4.0m < UDRE ≤ 8.0m, 8.0m < UDRE)	The value in this field shall be multiplied by the UDRE Scale Factor in the IE Status/Health to determine the final UDRE estimate for the particular satellite.
>PRC	MP		Real(-655.04..655.04 by step of 0.32)	meters (different from [13])
>RRC	MP		Real(-4.064..4.064 by step of 0.032)	meters/sec (different from [13])
>Delta PRC2	MP		Integer(-127..127)	meters
>Delta RRC2	MP		Real(-0.224..0.224 by step of 0.032)	meters/sec
>Delta PRC3	CV-*DCCH*		Integer(-127..127)	meters
>Delta RRC3	CV-*DCCH*		Real(-0.224..0.224 by step of 0.032)	meters/sec

Condition	Explanation
Status/Health	This IE is mandatory present if "status" is not equal to "no data" or "invalid data", otherwise the IE is not needed.
DCCH	This IE is mandatory present if the IE " UE positioning GPS DGPS corrections" it is included in the point-to-point message. It is optional if the IE "UE positioning GPS DGPS corrections" is included in the broadcast message. Otherwise it is not needed.

10.3.7.91a UE positioning GPS Ephemeris and Clock Correction parameters

This IE contains information for GPS ephemeris and clock correction.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
C/A or P on L2	MP		Bit string(2)	Code(s) on L2 Channel [12]
URA Index	MP		Bit string(4)	User Range Accuracy [12]
SV Health	MP		Bit string(6)	[12]
IODC	MP		Bit string(10)	Issue of Data, Clock [12]
L2 P Data Flag	MP		Bit string(1)	[12]
SF 1 Reserved	MP		Bit string(87)	[12]
T_{GD}	MP		Bit string(8)	Estimated group delay differential [12]
t_{oc}	MP		Bit string(16)	apparent clock correction [12]
af_2	MP		Bit string(8)	apparent clock correction [12]
af_1	MP		Bit string(16)	apparent clock correction [12]
af_0	MP		Bit string(22)	apparent clock correction [12]
C_{rs}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term to the Orbit Radius (meters) [12]
Δn	MP		Bit string(16)	Mean Motion Difference From Computed Value (semi-circles/sec) [12]
M_0	MP		Bit string(32)	Mean Anomaly at Reference Time (semi-circles) [12]
C_{uc}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term To The Argument Of Latitude (radians) [12]
e	MP		Bit string(32)	c
C_{us}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term To The Argument Of Latitude (radians) [12]
$(A)^{1/2}$	MP		Bit string(32)	Semi-Major Axis (meters)$^{1/2}$ [12]
t_{oe}	MP		Bit string(16)	Reference Time Ephemeris [12]
Fit Interval Flag	MP		Bit string(1)	[12]
AODO	MP		Bit string(5)	Age Of Data Offset [12]
C_{ic}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term To The Angle Of Inclination (radians) [12]
$OMEGA_0$	MP		Bit string(32)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles) [12]
C_{is}	MP		Bit string(16)	Amplitude of the Sine Harmonic Correction Term To The Angle Of Inclination (radians) [12]
i_0	MP		Bit string(32)	Inclination Angle at Reference Time (semi-circles) [12]
C_{rc}	MP		Bit string(16)	Amplitude of the Cosine Harmonic Correction Term to the Orbit Radius (meters) [12]
ω	MP		Bit string(32)	Argument of Perigee (semi-circles) [12]
OMEGAdot	MP		Bit string(24)	Longitude of Ascending Node of Orbit Plane at Weekly Epoch (semi-circles/sec) [12]
Idot	MP		Bit string(14)	Rate of Inclination Angle (semi-circles/sec) [12]

10.3.7.92 UE positioning GPS ionospheric model

The IE contains fields needed to model the propagation delays of the GPS signals through the ionosphere.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
α_0	MP		Bit string(8)	Note 1
α_1	MP		Bit string(8)	Note 1
α_2	MP		Bit string(8)	Note 1
α_3	MP		Bit string(8)	Note 1
β_0	MP		Bit string(8)	Note 2
β_1	MP		Bit string(8)	Note 2
β_2	MP		Bit string(8)	Note 2
β_3	MP		Bit string(8)	Note 2

NOTE 1: The parameters αn are the coefficients of a cubic equation representing the amplitude of the vertical delay [12].

NOTE 2: The parameters βn are the coefficients of a cubic equation representing the period of the ionospheric model [12].

10.3.7.93 UE positioning GPS measured results

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN reference time				
>>UE GPS timing of cell frames	MP		Integer(0..3715891199 9999	GPS Time of Week in units of 1/16th UMTS chips according to [19]
>>CHOICE *mode*	MP~~OP~~			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>Reference SFN	MP~~OP~~		Integer(0..4095)	The SFN for which the location is valid. If UE GPS timing of cell frames is included this is also the SFN which is time stamped
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). This time is the GPS TOW measured by the UE. ~~If the Reference SFN field is present it is the ms flank closest to the beginning of that frame. GPS Time of Week in microseconds = 1000 * GPS TOW msec + GPS TOW rem usec~~
~~GPS TOW rem usec~~	~~OP~~		~~Integer(0..999)~~	~~GPS Time of Week in microseconds MOD 1000.~~
Measurement Parameters	MP	1 to <maxSat>		
>Satellite ID	MP		Enumerated(0..63)	
>C/N_o	MP		Integer(0..63)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in unites of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).
>Doppler	MP		Integer(-32768..32768)	Hz, scale factor 0.2.
>Whole GPS Chips	MP		Integer(0..1023~~3~~)	Unit in GPS chips
>Fractional GPS Chips	MP		Integer(0..(2^10-1))	Scale factor 2^{-10}
>Multipath Indicator	MP		Enumerated(NM, low, medium, high)	See note 1
>Pseudorange RMS Error	MP		Enumerated(range index 0..range index 63)	See note 2

NOTE 1: The following table gives the mapping of the multipath indicator field.

Value	Multipath Indication
NM	Not measured
Low	MP error < 5m
Medium	5m < MP error < 43m
High	MP error > 43m

NOTE 2: The following table gives the bitmapping of the Pseudorange RMS Error field.

Range Index	Mantissa	Exponent	Floating-Point value, x_i	Pseudorange value, P
0	000	000	0.5	P < 0.5
1	001	000	0.5625	0.5 <= P < 0.5625
I	X	Y	$0.5 * (1 + x/8) * 2^y$	x_{i-1} <= P < x_i
62	110	111	112	104 <= P < 112
63	111	111	--	112 <= P

10.3.7.94 UE positioning GPS navigation model

This IE contain information required to manage the transfer of precise navigation data to the GPS-capable UE.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	Satellite ID
>Satellite Status	MP		Enumerated(NS_NN, ES_SN, ES_NN, REVD)	See note 1
>GPS Ephemeris and Clock Correction parameters	CV-*Satellite status*		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	

NOTE 1: The UE shall interpret enumerated symbols as follows.

Value	Indication
NS_NN	New satellite, new Navigation Model
ES_SN	Existing satellite, same Navigation Model
ES_NN	Existing satellite, new Navigation Model
REVD	Reserved

Condition	Explanation
Satellite status	The IE is not needed if the IE "Satellite status" is ES_SN and mandatory present otherwise.

10.3.7.95 UE positioning GPS real-time integrity

This IE contains parameters that describe the real-time status of the GPS constellation.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Satellite information	MP	1 to <maxSat>		
>BadSatID	MP		Enumerated(0..63)	

10.3.7.95a UE positioning GPS reference cell info

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell parameters ID	MP		Cell parameters id 10.3.6.9	

10.3.7.96 UE positioning GPS reference time

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Week	MP		Integer(0..1023)	
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0..2322431999999)	UTRAN GPS timing of cell frames in steps of 1/16th chips
~~GPS TOW rem usec~~	~~OP~~		~~Integer(0..999)~~	~~GPS Time of Week in microseconds MOD 1000. GPS Time of Week in microseconds = 1000 * GPS TOW msec + GPS TOW rem usec~~
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP~~OP~~		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames ~~GPS TOW~~ time stamps. ~~SFN and GPS TOW msec and GPS TOW rem usec are included if relation GPS TOW/SFN is known to at least 10 µs.~~
SFN-TOW Uncertainty	OP		Enumerated (lessThan10, moreThan10)	This field indicates the uncertainty of the relation GPS TOW/SFN. lessThan10 means the relation is accurate to at least 10 ms.
$T_{UTRAN-GPS}$ drift rate~~Node B Clock Drift~~	OP~~OP~~		Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)~~Real(-0.09375..0.09375 by step of 0.0125)~~	in 1/256 chips per sec ~~µ sec/sec (ppm)~~
$T_{UTRAN-GPS}$ drift rate~~Node B Clock Drift~~	OP~~OP~~		Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)~~Real(-0.09375..0.09375 by step of 0.0125)~~	in 1/256 chips per sec ~~µ sec/sec (ppm)~~
GPS TOW Assist	OP	1 to <maxSat>		
GPS TOW Assist	OP	1 to <maxSat>		

>SatID	MP		Enumerated(0..63)	
>TLM Message	MP		Bit string(14)	
>TLM Reserved	MP		Bit string(2)	
>Alert	MP		Boolean	
>Anti-Spoof	MP		Boolean	

10.3.7.97 UE positioning GPS UTC model

The UTC Model field contains a set of parameters needed to relate GPS time to Universal Time Coordinate (UTC).

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
A_1	MP		Bit string(24)	sec/sec [12]
A_0	MP		Bit string(32)	seconds [12]
t_{ot}	MP		Bit string(8)	seconds [12]
WN_t	MP		Bit string(8)	weeks [12]
Δt_{LS}	MP		Bit string(8)	seconds [12]
WN_{LSF}	MP		Bit string(8)	weeks [12]
DN	MP		Bit string(8)	days [12]
Δt_{LSF}	MP		Bit string(8)	seconds [12]

10.3.7.98 UE positioning IPDL parameters

This IE contains parameters for the IPDL mode. The use of this parameters is described in [29].

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
CHOICE *mode*					REL-4
>FDD					REL-4
>>IP spacing	MP		Integer(5,7,10,15,20,30,40,50)	See [29]	
>>IP length	MP		Integer(5,10)	See [29]	
>>IP offset	MP		Integer(0..9)	Relates the BFN and SFN, should be same as T_cell defined in [10]; See [29]	
>>Seed	MP		Integer(0..63)	See [29]	
>TDD					REL-4
>>IP spacing	MP		Integer(30,40,50,70,100)	See [33]	REL-4
>>IP_Start	MP		Integer(0..4095)	See [33]	REL-4
>>IP_Slot	MP		Integer(0..14)	See [33]	REL-4
>>IP_PCCPCH	CV-*channel*		Boolean	See [33]	REL-4
Burst mode parameters	OP				
>Burst Start	MP		Integer(0..15)	See [29] and [33]	
>Burst Length	MP		Integer(10..25)	See [29] and [33]	
>Burst freq	MP		Integer(1..16)	See [29] and [33]	

Condition	Explanation
channel	This IE is present only if the idle slot carries the PCCPCH

10.3.7.99 UE positioning measured results

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE positioning OTDOA measured results	OP		UE positioning OTDOA measured results 10.3.7.105	
UE positioning Position estimate info	OP		UE positioning Position estimate info 10.3.7.109	
UE positioning GPS measured results	OP		UE positioning GPS measured results 10.3.7.93	
UE positioning error	OP		UE positioning error 10.3.7.87	Included if UE positioning error occurred

10.3.7.100 UE positioning measurement

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE positioning reporting quantity	MP		UE positioning reporting quantity 10.3.7.111	
Measurement validity	OP		Measurement validity 10.3.7.51	
CHOICE *reporting criteria*	MP			
>UE positioning reporting criteria			UE positioning reporting criteria 10.3.7.110	
>Periodical reporting criteria			Periodical reporting criteria 10.3.7.53	
>No reporting				(no data) Chosen when this measurement only is used as additional measurement to another measurement
UE positioning OTDOA assistance data for UE-assisted	~~CV-OTDOA~~OP		UE positioning OTDOA assistance data for UE-assisted 10.3.7.103	
UE positioning OTDOA assistance data for UE-based	OP		UE positioning OTDOA assistance data for UE-based 10.3.7.103a	
UE positioning GPS assistance data	OP		UE positioning GPS assistance data 10.3.7.90	

~~Condition~~	~~Explanation~~
~~*OTDOA*~~	~~This IE is mandatory present if the IE "Positioning method" is set to "OTDOA" or "OTDOA or GPS" and not needed otherwise.~~

10.3.7.101 UE positioning measurement event results

This IE contains the measurement event results that are reported to UTRAN for UE positioning measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Event ID*	MP			
>7a				
>>UE positioning Position estimate info	MP		UE positioning Position estimate info 10.3.7.109	
>7b				
>>UE positioning OTDOA measured results~~ment~~	MP		UE positioning OTDOA measured reults~~ment~~ 10.3.7.105	
>7c				
>>UE positioning GPS measuremed results~~nt~~	MP		UE positioning GPS measureme d results~~nt~~ 10.3.7.93	

10.3.7.102 Void

10.3.7.103 UE positioning OTDOA assistance data for UE-assisted

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info for UE-assisted	OP		UE positioning OTDOA reference cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list for UE-assisted	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-assisted	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	

10.3.7.103a UE positioning OTDOA assistance data for UE-based

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info for UE-based	OP		UE positioning OTDOA reference cell info for UE-based 10.3.7.108a	
UE positioning OTDOA neighbour cell list for UE-based	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-based	MP		UE positioning OTDOA neighbour cell info for UE-based 10.3.7.106a	

10.3.7.104 Void

10.3.7.105 UE positioning OTDOA measured results~~ment~~

The purpose of the OTDOA Measurement Information element is to provide OTDOA measurements of signals sent from the reference and neighbour cells.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	MP		Integer(0..4095)	SFN during which the last measurement was performed
CHOICE *mode*				
>FDD				
>>Reference cell id	MP		Primary CPICH info 10.3.6.60	
>>UE Rx-Tx time difference type 2 info	MP			
>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the reference cell.
>TDD				(no data)
>>Reference cell id	MP		Cell parameters ID 10.3.6.9	
Neighbours	MP	0 to <maxCellMeas>		
>CHOICE *mode*	MP			
>>FDD				
>>>Neighbour Identity	MD		Primary CPICH info 10.3.6.60	Default value is the same as in the first set of multiple sets.
>>>Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
>>>UE Rx-Tx time difference type 2 info	OP			Included if the neighbour is in the active set
>>>>UE Rx-Tx time difference type 2	MP		UE Rx-Tx time difference type 2 10.3.7.84	
>>>>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the UE Rx-Tx time difference type 2 measurement from the neighbour cell.
>>TDD				
>>>Cell and Channel ID	MD		Cell and Channel Identity info 10.3.6.8a	Default value is the same as in the first set of multiple sets.
>UE positioning OTDOA quality	MP		UE positioning OTDOA quality 10.3.7.107	Quality of the SFN-SFN observed time difference type 2 measurement from the neighbour cell.
>SFN-SFN observed time difference type 2	MP		SFN-SFN observed time difference 10.3.7.63	Gives the timing relative to the reference cell. Only type 2 is allowed.

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window., ~~as well as the cell locations and fine cell timing for UE based OTDOA.~~

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-*IPDLs*		UE positioning IPDL parameters 10.3.7.98	
SFN offset	CV-*IPDLs*		Integer (0 .. 4095)	Define Tref as the time of beginning of system frame number SFNref of the reference cell. Define Tnc as the beginning of a frame from the neighbour cell occurring immediately after the time Tref. Let the corresponding system frame number be SFNnc. Then SFNnc = SFNref-SFN offset modulo 4096.
SFN-SFN relative time difference	MP		Integer(0.. 38399)	Gives the relative timing compared to the reference cell Equal to (Tnc-Tref)/(3.84*10^6) ⌋ where ⌊()⌋ denotes rounding to the nearest lower integer. in chips.
SFN-SFN drift	OP		~~Real(0,+0.33,+0.66,+1,+1.33,+1.66,+2,+2.5,+3,+4,+5,+7,+9,+11,+13,+15,-0.33,-0.66,-1,-1.33,-1.66,-2,-2.5,-3,-4,-5,-7,-9,-11,-13,-15)~~ Integer (0, -1, -2, -3, -4, -5, -8, -10, -15, -25, -35, -50, -65, -80, -100, 1, 2, 3, 4, 5, 8, 10, 15, 25, 35, 50, 65, 80, 100)	in 1/256 chips per second ~~meters/sec~~
Search Window Size	MP		Integer(20, 40, 80, 160, 320, 640, 1280, infinity)	in chips. If the value is X then the expected SFN-SFN observed time difference is in the range [RTD-X, RTD+X] where RTD is the value of the field SFN-SFN relative time difference. Infinity means that the

				uncertainty is larger than 1280 chips.
CHOICE *PositioningMode*	MP			
>UE based				(no data)
~~>>Cell Position~~	~~MD~~			~~Default is the same as previous cell~~
~~>>>Relative North~~	~~OP~~		~~Integer(-20000..20000)~~	~~Seconds, scale factor 0.03. Relative position compared to reference cell.~~
~~>>>Relative East~~	~~OP~~		~~Integer(-20000..20000)~~	~~Seconds, scale factor 0.03. Relative position compared to reference cell.~~
~~>>>Relative Altitude~~	~~OP~~		~~Integer(-4000..4000)~~	~~Relative altitude in meters compared to ref. cell.~~
~~>>Fine SFN-SFN~~	~~MP~~		~~Real(0..0.9375 in steps of 0.0625)~~	~~Gives finer resolution~~
~~>>Round Trip Time~~	~~OP~~		~~Real(876.00 .. 2923.875) in steps of 0.0625~~	~~In chips. Included if cell is in active set.~~
>UE assisted				(no data)

Condition	Explanation
IPDLs	This IE is mandatory present if IPDLs are applied and not needed otherwise.

10.3.7.106a UE positioning OTDOA neighbour cell info for UE-based

This IE gives approximate cell timing in order to decrease the search window, as well as the cell locations and fine cell timing for UE based OTDOA.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA neighbour cell info	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	
Cell Position	MD			Default is the same as previous cell
>Relative North	OP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>Relative East	OP		Integer(-20000..20000)	Seconds, scale factor 0.03. Relative position compared to reference cell.
>Relative Altitude	OP		Integer(-4000..4000)	Relative altitude in meters compared to ref. cell.
Fine SFN-SFN	MP		Real(0..0.9375 in steps of 0.0625)	Gives finer resolution
UE positioning Relative Time Difference Quality	MP		UE positioning OTDOA quality 10.3.7.109a	Quality of the relative time difference between neighbour and reference cell.
Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips. Included if cell is in active set.

10.3.7.107 UE positioning OTDOA quality

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Std Resolution	MP		Bit string(2)	Std Resolution field includes the resolution used in Std of OTDOA Measurements field. Encoding on two bits as follows: '00' 10 meters '01' 20 meters '10' 30 meters '11' Reserved
Number of OTDOA Measurements	MP		Bit string(3)	Number of measurements field is used together with Std of OTDOA Measurements field to define quality of a reported OTDOA measurement. The field indicates how many OTDOA measurements have been used in the UE to define the standard deviation of the measurements. Following 3 bit encoding is used: '000' 0-4 '001' 5-9 '010' 10-14 '011' 15-24 '100' 25-34 '101' 35-44 '110' 45-54 '111' 55 or more
Std of OTDOA Measurements	MP		Bit string(5)	Std of OTDOA Measurements field includes standard deviation of OTDOA measurements. Following linear 5 bit encoding is used: '00000' 0 - (R*1-1) meters '00001' R*1 – (R*2-1) meters '00010' R*2 – (R*3-1) meters … '11111' R*31 meters or more where R is the resolution defined by Std Resolution field. E.g. R=20 m corresponds to 0-19 m, 20-39 m,…,620+ m.

10.3.7.108 UE positioning OTDOA reference cell info

This IE defines the cell used for time references in all OTDOA measurements.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
SFN	OP		Integer (0..4095)	Time stamp (SFN of Reference Cell) of the SFN-SFN relative time differences and SFN-SFN drift rates. Included if any SFN-SFN drift value is included in IE UE positioning OTDOA neighbour cell info.
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information. This IE shall always be set to default value
CHOICE *PositioningMode*	MP			
>UE based				(no data)
~~>>CHOICE *Cell Position*~~	~~OP~~			~~The position of the antenna that defines the cell. Used for the UE based method.~~
~~>>>Ellipsoid~~				
~~>>>>Ellipsoid point~~	~~MP~~		~~Ellipsoid point 10.3.8.4a~~	
~~>>>Ellipsoid with altitude~~				
~~>>>>Ellipsoid point with altitude~~	~~MP~~		~~Ellipsoid point with altitude 10.3.8.4b~~	
~~>>Round Trip Time~~	~~OP~~		~~Real(876.00 .. 2923.875) in steps of 0.0625~~	~~In chips.~~
>UE assisted				(no data)
IPDL parameters	OP		UE positioning IPDL parameters 10.3.7.98	If this element is not included there are no idle periods present

10.3.7.108a UE positioning OTDOA reference cell info for UE-based

This IE defines the cell used for time references in all OTDOA measurements for UE-based methods.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
UE positioning OTDOA reference cell info	MP		UE positioning OTDOA reference cell info 10.3.7.108	
CHOICE *Cell Position*	OP			The position of the antenna that defines the cell. Used for the UE based method.
>Ellipsoid				
>>Ellipsoid point	MP		Ellipsoid point 10.3.8.4a	
>Ellipsoid with altitude				
>>Ellipsoid point with altitude	MP		Ellipsoid point with altitude 10.3.8.4b	
Round Trip Time	OP		Real(876.00 .. 2923.875) in steps of 0.0625	In chips.

10.3.7.109 UE positioning position estimate info

The purpose of this IE is to provide the position estimate from the UE to the network, if the UE is capable of determining its own position.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN GPS reference time				
>>UE GPS timing of cell frames	MP		Integer(0..3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19].
>>CHOICE *mode*	MP~~OP~~			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>>Reference SFN	MP~~OP~~		Integer(0..4095)	The SFN for which the location is valid and which the UTRAN GPS timing of cell frames time stamps
>GPS reference time only				
>>GPS TOW msec	MP~~OP~~		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). ~~This time-stamps the beginning of the frame defined in Reference SFN~~ ~~GPS Time of Week in microseconds = 1000 * GPS TOW msec + GPS TOW rem usec~~
>Cell timing				
>>SFN	MP		Integer(0..4095)	SFN during which the position was calculated
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for SFN
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies reference cell for SFN
~~GPS TOW rem usec~~	~~OP~~		~~Integer(0..999)~~	~~GPS Time of Week in microseconds MOD 1000.~~
CHOICE *Position estimate*	MP			
>Ellipsoid Point			Ellipsoid Point; 10.3.8.4a	
>Ellipsoid point with uncertainty circle			Ellipsoid point with uncertainty circle 10.3.8.4d	
>Ellipsoid point with uncertainty ellipse			Ellipsoid point with uncertainty ellipse 10.3.8.4e	
>Ellipsoid point with altitude			Ellipsoid point with altitude 10.3.8.4b	

>Ellipsoid point with altitude and uncertainty ellipsoid			Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	

10.3.7.109a UE positioning Relative Time Difference quality

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Relative Time Difference Std Resolution	MP		Bit string(2)	Std Resolution field includes the resolution used in Std of Relative Time Difference field. Encoding on two bits as follows: '00' 10 meters '01' 20 meters '10' 30 meters '11' Reserved
Std of Relative Time Difference	MP		Bit string(5)	Std of Relative Time difference field includes standard deviation of (SFN-SFN relative time difference + Fine SFN-SFN). Following linear 5 bit encoding is used: '00000' 0 - (R*1-1) meters '00001' R*1 – (R*2-1) meters '00010' R*2 – (R*3-1) meters ... '11111' R*31 meters or more where R is the resolution defined by Std Resolution field. E.g. R=20 m corresponds to 0-19 m, 20-39 m,…,620+ m.

10.3.7.110 UE positioning reporting criteria

The triggering of the event-triggered reporting for an UE positioning measurement.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Parameters required for each event	OP	1 to <maxMeasEvent>		
>Amount of reporting	MP		Integer(1, 2, 4, 8, 16, 32, 64,infinite)	
>Report first fix	MP		Boolean	If true the UE reports the position once the measurement control is received, and then each time an event is triggered.
>Measurement interval	MP		Integer(5,15,60,300,900,1800,3600,7200)	Indicates how often the UE should make the measurement In seconds
>CHOICE *Event ID*	MP			
>>7a				
>>>Threshold Position Change	MP		Integer(10,20,30,40,50,100,200,300,500,1000,2000,5000,10000,20000,50000,100000)	Indicated how much the position should change compared to last reported position fix in order to trigger the event.
>>7b				
>>>Threshold SFN-SFN change	MP		Real(0.25,0.5,1,2,3,4,5,10,20,50,100,200,500,1000,2000,5000)	Chips. Indicates how much the SFN-SFN measurement of ANY measured cell is allowed to change before the event is triggered.
>>7c				
>>>Threshold SFN-GPS TOW	MP		Integer(1,2,3,5,10,20,50,100)	Time in ms. When the GPS TOW and SFN timer has drifted apart more than the specified value the event is triggered)

10.3.7.111 UE positioning reporting quantity

The purpose of the element is to express the allowed/required location method(s), and to provide information ~~required~~ desired QoS.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Method Type	MP		Enumerated(UE assisted, UE based, UE based is preferred but UE assisted is allowed, UE assisted is preferred but UE based is allowed)	
Positioning Methods	MP		Enumerated(OTDOA, GPS, OTDOA or GPS, Cell ID)	
Response Time	MP		Integer(1,2,4, 8, 16, 32, 64, 128)	This IE shall be ignored~~in seconds~~
Horizontal Accuracy	CV-*MethodType*		Bit string(7)	The uncertainty is derived from the "uncertainty code" k by $r = 10*(1.1^k-1)$
Vertical Accuracy	CV-*MethodType*		Bit string(7)	The uncertainty is derived from the "uncertainty code" k by $r = 45*(1.025^k-1)$
GPS timing of Cell wanted	MP		Boolean	If true the SRNC wants the UE to report the SFN-GPS timing of the reference cell. This is however optional in the UE.
Multiple Sets	MP		Boolean	This IE shall be ignored.~~TRUE indicates that the UE is requested to send multiple *OTDOA/GPS Measurement Information Sets*. UE is expected to include the current measurement set.~~
Additional Assistance Data Request	MP		Boolean	TRUE indicates that the UE is requested to send the IE "Additional assistance Data Request" when the IE "UE positioning Error" is present in the UE positioning measured results.
Environment Characterisation	OP		Enumerated(possibly heavy multipath and NLOS conditions, no or light multipath and usually LOS conditions, not defined or mixed environment)	

Condition	Explanation
Method Type	The IE is optional if the IE "Method Type" is "UE assisted"; otherwise it is mandatory present.

10.3.8.21 SIB type

The SIB type identifies a specific system information block.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB type	MP		Enumerated, see below	

The list of values to encode is:

Master information block,

System Information Type 1,

System Information Type 2,

System Information Type 3,

System Information Type 4,

System Information Type 5,

System Information Type 6,

System Information Type 7,

System Information Type 8,

System Information Type 9,

System Information Type 10,

System Information Type 11,

System Information Type 12,

System Information Type 13,

System Information Type 13.1,

System Information Type 13.2,

System Information Type 13.3,

System Information Type 13.4,

System Information Type 14,

System Information Type 15,

System Information Type 15.1,

System Information Type 15.2,

System Information Type 15.3,

System Information Type 15.4,

System Information Type 15.5,

System Information Type 16,

System Information Type 17,

System Information Type 18,

Scheduling Block 1,

Scheduling Block 2.

In addition, at least one spare value, criticality: ignore, is needed.

10.3.8.22 SIB type SIBs only

The SIB type identifies a specific system information block.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
SIB type SIBs only	MP		Enumerated, see below	

The list of values to encode is:

System Information Type 1,

System Information Type 2,

System Information Type 3,

System Information Type 4,

System Information Type 5,

System Information Type 6,

System Information Type 7,

System Information Type 8,

System Information Type 9,

System Information Type 10,

System Information Type 11,

System Information Type 12,

System Information Type 13,

System Information Type 13.1,

System Information Type 13.2,

System Information Type 13.3,

System Information Type 13.4,

System Information Type 14,

System Information Type 15,

System Information Type 15.1,

System Information Type 15.2,

System Information Type 15.3,

System Information Type 15.4,

System Information Type 15.5,

System Information Type 16,

System Information Type 17,

System Information Type 18.

In addition, at least one spare value, criticality: ignore, is needed.

11.2 PDU definitions

```
…

-- ****************************************************
--
-- Assistance Data Delivery
--
-- ****************************************************

AssistanceDataDelivery ::= CHOICE {
    r3                              SEQUENCE {
        assistanceDataDelivery-r3       AssistanceDataDelivery-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            assistanceDataDelivery-r3-r4-ext
                                            AssistanceDataDelivery-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

AssistanceDataDelivery-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
    rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Measurement Information Elements
    ue-positioning-GPS-AssistanceData           UE-Positioning-GPS-AssistanceData
    OPTIONAL,
    ue-positioning-OTDOA-AssistanceData-UEB         UE-Positioning-OTDOA-AssistanceData-UEB
    OPTIONAL
}

AssistanceDataDelivery-r3-r4-ext-IEs ::= SEQUENCE {
    ue-Positioning-OTDOA-AssistanceData-r4ext   UE-Positioning-OTDOA-AssistanceData-r4ext   OPTIONAL
}
…

-- ****************************************************
--
-- MEASUREMENT CONTROL
--
-- ****************************************************

MeasurementControl ::= CHOICE {
    r3                              SEQUENCE {
        measurementControl-r3           MeasurementControl-r3-IEs,
        v390nonCriticalExtensions           SEQUENCE {
            measurementControl-v390ext      MeasurementControl-v390ext,
            nonCriticalExtensions           SEQUENCE{
                measurementControl-r3-r4-ext    MeasurementControl-r3-r4-ext-IEs,
                nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
            }                           OPTIONAL
        }                                                                   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                measurementControl-r4           MeasurementControl-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

MeasurementControl-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Measurement IEs
        measurementIdentity     MeasurementIdentity,
        measurementCommand              MeasurementCommand,
        -- TABULAR: The measurement type is included in MeasurementCommand.
        measurementReportingMode        MeasurementReportingMode            OPTIONAL,
```

```
        additionalMeasurementList       AdditionalMeasurementID-List        OPTIONAL,
    -- Physical channel IEs
        dpch-CompressedModeStatusInfo   DPCH-CompressedModeStatusInfo       OPTIONAL
}

MeasurementControl-r3-r4-ext-IEs ::= SEQUENCE {
    ue-Positioning-OTDOA-AssistanceData-r4ext   UE-Positioning-OTDOA-AssistanceData-r4ext   OPTIONAL
}

MeasurementControl-v390ext ::= SEQUENCE {
        ue-Positioning-Measurement-v390ext      UE-Positioning-Measurement-v390ext  OPTIONAL
}

 MeasurementControl-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Measurement IEs
        measurementIdentity     MeasurementIdentity,
        measurementCommand              MeasurementCommand-r4,
        -- TABULAR: The measurement type is included in MeasurementCommand.
        measurementReportingMode        MeasurementReportingMode            OPTIONAL,
        additionalMeasurementList       AdditionalMeasurementID-List        OPTIONAL,
    -- Physical channel IEs
        dpch-CompressedModeStatusInfo   DPCH-CompressedModeStatusInfo       OPTIONAL
}

-- **************************************************
--
-- MEASUREMENT CONTROL FAILURE
--
-- **************************************************

MeasurementControlFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- **************************************************
--
-- MEASUREMENT REPORT
--
-- **************************************************

MeasurementReport ::= SEQUENCE {
    -- Measurement IEs
        measurementIdentity     MeasurementIdentity,
        measuredResults                 MeasuredResults                     OPTIONAL,
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
        additionalMeasuredResults       MeasuredResultsList                 OPTIONAL,
        eventResults                    EventResults                        OPTIONAL,
    -- Extension mechanism for non- release99 information
        v390nonCriticalExtensions           SEQUENCE {
            measurementReport-v390ext       MeasurementReport-v390ext,
            nonCriticalExtensions           SEQUENCE {
                measurementReport-r3-r4-ext     MeasurementReport-r3-r4-ext-IEs,
                nonCriticalExtensions           SEQUENCE {}                 OPTIONAL
            }                               OPTIONAL
        }                                                                   OPTIONAL
}


MeasurementReport-v390ext ::= SEQUENCE{
        measuredResults-v390ext         MeasuredResults-v390ext             OPTIONAL,
}

MeasurementReport-r3-r4-ext-IEs ::= SEQUENCE {
    interFreqEventResults-LCR       InterFreqEventResults-LCR-r4-ext        OPTIONAL,
    additionalMeasuredResults-LCR   MeasuredResultsList-LCR-r4-ext          OPTIONAL
}
…
```

11.3 Information element definitions

```
…

-- **************************************************
--
--     USER EQUIPMENT INFORMATION ELEMENTS (10.3.3)
--
-- **************************************************
…

UE-Positioning-Capability ::=                   SEQUENCE {
    standaloneLocMethodsSupported       BOOLEAN,
    ue-BasedOTDOA-Supported             BOOLEAN,
    networkAssistedGPS-Supported        NetworkAssistedGPS-Supported,
    supportForUE-GPS-TimingOfCellFramesgps-ReferenceTimeCapable         BOOLEAN,
    supportForIPDL                      BOOLEAN
}
…

-- **************************************************
--
--     MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- **************************************************
…

GPS-TOW-rem-usec ::=                INTEGER (0..999)


…

MeasuredResults ::=                 CHOICE {
    intraFreqMeasuredResultsList        IntraFreqMeasuredResultsList,
    interFreqMeasuredResultsList        InterFreqMeasuredResultsList,
    interRATMeasuredResultsList     InterRATMeasuredResultsList,
    trafficVolumeMeasuredResultsList    TrafficVolumeMeasuredResultsList,
    qualityMeasuredResults              QualityMeasuredResults,
    ue-InternalMeasuredResults          UE-InternalMeasuredResults,
    ue-positioning-MeasuredResults                  UE-Positioning-MeasuredResults
}

MeasuredResults-v390ext ::=                 SEQUENCE {
    ue-positioning-MeasuredResults-v390ext                  UE-Positioning-MeasuredResults-v390ext
}

MeasuredResults-LCR-r4 ::=          CHOICE {
    intraFreqMeasuredResultsList        IntraFreqMeasuredResultsList,
    interFreqMeasuredResultsList        InterFreqMeasuredResultsList,
    interRATMeasuredResultsList     InterRATMeasuredResultsList,
    trafficVolumeMeasuredResultsList    TrafficVolumeMeasuredResultsList,
    qualityMeasuredResults              QualityMeasuredResults,
    ue-InternalMeasuredResults          UE-InternalMeasuredResults-LCR-r4,
    ue-positioniing-MeasuredResults     UE-Positioning-MeasuredResults
}

MeasuredResultsList ::=             SEQUENCE (SIZE (1..maxAdditionalMeas)) OF
                                        MeasuredResults

MeasuredResultsList-LCR-r4-ext ::=  SEQUENCE (SIZE (1..maxAdditionalMeas)) OF
                                        MeasuredResults-LCR-r4


…

Neighbour ::=                       SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            neighbourIdentity                   PrimaryCPICH-Info                   OPTIONAL,
            uE-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info    OPTIONAL
        },
        tdd                             SEQUENCE {
            neighbourAndChannelIdentity     CellAndChannelIdentity                  OPTIONAL
        }
    },
    neighbourQuality                    NeighbourQuality,
    sfn-SFN-ObsTimeDifference2          SFN-SFN-ObsTimeDifference2}
```

```
NeighbourList ::=                   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        Neighbour

Neighbour-v390ext ::=                       SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            frequencyInfo                       FrequencyInfo
        },
        tdd                             NULL
    }
}

NeighbourList-v390ext ::=                   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        Neighbour-v390ext
-- The order of the cells in IE NeighbourList-v390ext shall be the
-- same as the order in IE NeighbourList

…
-- Actual value = IE value * 0.0125 – 0.09375
NodeB-ClockDrift ::=                INTEGER (0..15)


    SFN-SFN-Drift ::=                   ENUMERATED { sfnsfndrift0, sfnsfndrift1, sfnsfndrift2,
                                        sfnsfndrift3, sfnsfndrift4, sfnsfndrift5, sfnsfndrift8,
                                        sfnsfndrift10, sfnsfndrift15, sfnsfndrift25, sfnsfndrift35,
                                        sfnsfndrift50, sfnsfndrift65, sfnsfndrift80, sfnsfndrift100,
                                        sfnsfndrift-1, sfnsfndrift-2, sfnsfndrift-3, sfnsfndrift-4,
                                        sfnsfndrift-5, sfnsfndrift-8, sfnsfndrift-10, sfnsfndrift-
                                        15, sfnsfndrift-25, sfnsfndrift-35, sfnsfndrift-50,
                                        sfnsfndrift-65, sfnsfndrift-80, sfnsfndrift-100no-drift,
                                        sfnsfndrift0-33, sfnsfndrift0-66,
                                        sfnsfndrift1, sfnsfndrift1-33, sfnsfndrift1-66,
                                        sfnsfndrift2, sfnsfndrift2-5, sfnsfndrift3,
                                        sfnsfndrift4, sfnsfndrift5, sfnsfndrift7,
                                        sfnsfndrift9, sfnsfndrift11, sfnsfndrift13,
                                        sfnsfndrift15, sfnsfndrift-0-33, sfnsfndrift-0-66,
                                        sfnsfndrift-1, sfnsfndrift-1-33, sfnsfndrift-1-66,
                                        sfnsfndrift-2, sfnsfndrift-2-5, sfnsfndrift-3,
                                        sfnsfndrift-4, sfnsfndrift-5, sfnsfndrift-7,
                                        sfnsfndrift-9, sfnsfndrift-11, sfnsfndrift-13,
                                        sfnsfndrift-15}

…


UE-Positioning-GPS-AcquisitionAssistance ::=    SEQUENCE {
    gps-ReferenceTime               INTEGER (0..604799999),
    utran-GPSReferenceTime              UTRAN-GPSReferenceTime          OPTIONAL,
    referenceTime                       CHOICE {
        utran-ReferenceTime                 UTRAN-ReferenceTime,
        gps-ReferenceTimeOnly               INTEGER (0..604799999)
    },
    satelliteInformationList            AcquisitionSatInfoList
}
…

UE-Positioning-GPS-AssistanceData ::=           SEQUENCE {
    ue-positioning-GPS-ReferenceTime                UE-Positioning-GPS-ReferenceTime
    OPTIONAL,
    ue-positioning-GPS-ReferenceLocation            ReferenceLocation               OPTIONAL,
    ue-positioning-GPS-DGPS-Corrections             UE-Positioning-GPS-DGPS-Corrections
    OPTIONAL,
    ue-positioning-GPS-NavigationModel              UE-Positioning-GPS-NavigationModel
    OPTIONAL,
    ue-positioning-GPS-IonosphericModel             UE-Positioning-GPS-IonosphericModel
    OPTIONAL,
    ue-positioning-GPS-UTC-Model                    UE-Positioning-GPS-UTC-Model
    OPTIONAL,
    ue-positioning-GPS-Almanac                      UE-Positioning-GPS-Almanac
    OPTIONAL,
    ue-positioning-GPS-AcquisitionAssistance        UE-Positioning-GPS-AcquisitionAssistance
    OPTIONAL,
    ue-positioning-GPS-Real-timeIntegrity           BadSatList                          OPTIONAL
    ue-positioning-GPS-referenceCellInfo            UE-Positioning-GPS-ReferenceCellInfo
    OPTIONAL
}

..
```

```
UE-Positioning-GPS-MeasurementResults ::=       SEQUENCE {
    referenceTime                           CHOICE {
        utran-GPSReferenceTimeResult            UTRAN-GPSReferenceTimeResult,
        gps-ReferenceTimeOnly               INTEGER (0..604799999)
    },
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE {
            referenceIdentity                   CellParametersID
        }
    }                                                                   OPTIONAL,
    referenceSFN                            ReferenceSFN                OPTIONAL,
    gps-TOW-1msec                           GPS-TOW-1msec,
    gps-TOW-rem-usec                        GPS-TOW-rem-usec            OPTIONAL,
    gps-MeasurementParamList            GPS-MeasurementParamList
}
..

UE-Positioning-GPS-ReferenceCellInfo ::=        SEQUENCE{
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity               CellParametersID
        }
}


UE-Positioning-GPS-ReferenceTime ::=            SEQUENCE {
    gps-Week                            INTEGER (0..1023),
    gps-tow-1msec                       GPS-TOW-1msec,
    gps-tow-rem-usec                    GPS-TOW-rem-usec            OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE {
            referenceIdentity                   CellParametersID
        }
    }                                                               OPTIONAL,
    sfn                                 INTEGER (0..4095)           OPTIONAL,
    utran-GPSReferenceTime              UTRAN-GPSReferenceTime      OPTIONAL,
    sfn-tow-Uncertainty                 SFN-TOW-Uncertainty         OPTIONAL,
    nodeBClockDrift                     NodeB-ClockDrift            OPTIONAL,
    utran-GPS-DriftRate                 UTRAN-GPS-DriftRate         OPTIONAL,
    gps-TOW-AssistList                  GPS-TOW-AssistList          OPTIONAL
}

UE-Positioning-GPS-UTC-Model ::=                SEQUENCE {
    a1                                  BIT STRING (SIZE (24)),
    a0                                  BIT STRING (SIZE (32)),
    t-ot                                BIT STRING (SIZE (8)),
    wn-t                                BIT STRING (SIZE (8)),
    delta-t-LS                          BIT STRING (SIZE (8)),
    wn-lsf                              BIT STRING (SIZE (8)),
    dn                                  BIT STRING (SIZE (8)),
    delta-t-LSF                         BIT STRING (SIZE (8))
}

UE-Positioning-IPDL-Parameters ::=              SEQUENCE {
    ip-Spacing                          IP-Spacing,
    ip-Length                           IP-Length,
    ip-Offset                           INTEGER (0..9),
    seed                                INTEGER (0..63),
    burstModeParameters                 BurstModeParameters         OPTIONAL
}

UE-Positioning-IPDL-Parameters-r4 ::=           SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ip-Spacing                          IP-Spacing,
            ip-Length                           IP-Length,
            ip-Offset                           INTEGER (0..9),
            seed                                INTEGER (0..63)
```

```
        },
        tdd                                 SEQUENCE {
            ip-Spacing-TDD                      IP-Spacing-TDD,
            ip-slot                             INTEGER (0..14),
            ip-Start                            INTEGER (0..4095),
            ip-PCCPCG                           IP-PCCPCH-r4            OPTIONAL
        }
    },
    burstModeParameters                 BurstModeParameters
}

UE-Positioning-IPDL-Parameters-TDD-r4-ext ::=   SEQUENCE {
    ip-Spacing                          IP-Spacing-TDD,
    ip-slot                             INTEGER (0..14),
    ip-Start                            INTEGER (0..4095),
    ip-PCCPCG                           IP-PCCPCH-r4                    OPTIONAL,
    burstModeParameters                 BurstModeParameters
}

UE-Positioning-MeasuredResults ::=              SEQUENCE {
    ue-positioning-OTDOA-Measurement                UE-Positioning-OTDOA-Measurement
    OPTIONAL,
    ue-positioning-PositionEstimateInfo             UE-Positioning-PositionEstimateInfo
        OPTIONAL,
    ue-positioning-GPS-Measurement                  UE-Positioning-GPS-MeasurementResults
        OPTIONAL,
    ue-positioning-Error                            UE-Positioning-Error
    OPTIONAL
}

UE-Positioning-Measurement ::=                  SEQUENCE {
    ue-positioning-ReportingQuantity                UE-Positioning-ReportingQuantity,
    reportCriteria                      UE-Positioning-ReportCriteria,
    ue-positioning-OTDOA-AssistanceData         UE-Positioning-OTDOA-AssistanceData
    OPTIONAL,
    ue-positioning-GPS-AssistanceData               UE-Positioning-GPS-AssistanceData
    OPTIONAL
}

UE-Positioning-Measurement-v390ext ::=          SEQUENCE {
    ue-positioning-ReportingQuantity-v390ext        UE-Positioning-ReportingQuantity-v390ext
    OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    ue-positioning-OTDOA-AssistanceData-UEB         UE-Positioning-OTDOA-AssistanceData-UEB
    OPTIONAL
}

UE-Positioning-Measurement-r4 ::=               SEQUENCE {
    ue-positioning-ReportingQuantity                UE-Positioning-ReportingQuantity,
    reportCriteria                                  UE-Positioning-ReportCriteria,
    ue-positioning-OTDOA-AssistanceData             UE-Positioning-OTDOA-AssistanceData-r4
    OPTIONAL,
    ue-positioning-GPS-AssistanceData               UE-Positioning-GPS-AssistanceData
    OPTIONAL
}

UE-Positioning-MeasurementEventResults ::=      CHOICE {
    event7a                             UE-Positioning-PositionEstimateInfo,
    event7b                             UE-Positioning-OTDOA-Measurement,
    event7c                             UE-Positioning-GPS-MeasurementResults
}

UE-Positioning-MeasurementInterval ::=          ENUMERATED {
                                        e5, e15, e60, e300,
                                        e900, e1800, e3600, e7200 }

UE-Positioning-MethodType ::=                   ENUMERATED {
                                        ue-Assisted,
                                        ue-Based,
                                        ue-BasedPreferred,
                                        ue-AssistedPreferred }

UE-Positioning-OTDOA-AssistanceData ::=     SEQUENCE {
    ue-positioning-OTDOA-ReferenceCellInfo          UE-Positioning-OTDOA-ReferenceCellInfo
    OPTIONAL,
    ue-positioning-OTDOA-NeighbourCellList              UE-Positioning-OTDOA-NeighbourCellList
        OPTIONAL
}
```

```
UE-Positioning-OTDOA-AssistanceData-UEB ::=     SEQUENCE {
    ue-positioning-OTDOA-ReferenceCellInfo-UEB          UE-Positioning-OTDOA-ReferenceCellInfo-UEB
                OPTIONAL,
    ue-positioning-OTDOA-NeighbourCellList-UEB              UE-Positioning-OTDOA-NeighbourCellList-
UEB             OPTIONAL
}

UE-Positioning-OTDOA-AssistanceData-r4 ::=  SEQUENCE {
    ue-positioning-OTDOA-ReferenceCellInfo          UE-Positioning-OTDOA-ReferenceCellInfo-r4
        OPTIONAL,
    ue-positioning-OTDOA-NeighbourCellList          UE-Positioning-OTDOA-NeighbourCellList-r4
        OPTIONAL
}

UE-Positioning-OTDOA-AssistanceData-r4ext ::= SEQUENCE {
    -- In case of TDD these IPDL parameters shall be used for the reference cell instead of
    -- IPDL Parameters in IE UE-Positioning-OTDOA-ReferenceCellInfo
    ue-Positioning-IPDL-Parameters-TDD-r4-ext       UE-Positioning-IPDL-Parameters-TDD-r4-ext
    OPTIONAL,
    -- These IPDL parameters shall be used for the neighbour cells in case of TDD instead of
    -- IPDL Parameters in IE UE-Positioning-OTDOA-NeighbourCellInfoList. The cells shall be
    -- listed in the same order as in IE UE-Positioning-OTDOA-NeighbourCellInfoList
    ue-Positioning-IPDL-Parameters-TDDList-r4-ext   UE-Positioning-IPDL-Parameters-TDDList-r4-ext
    OPTIONAL
}

UE-Positioning-IPDL-Parameters-TDDList-r4-ext ::=   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        UE-Positioning-IPDL-Parameters-TDD-r4-ext

UE-Positioning-OTDOA-Measurement ::=            SEQUENCE {
    sfn                                 INTEGER (0..4095),
    modeSpecificInfo                CHOICE {
        fdd                                 SEQUENCE {
            referenceCellIDentity               PrimaryCPICH-Info,
            ue-RX-TX-TimeDifferenceType2Info    UE-RX-TX-TimeDifferenceType2Info
        },
        tdd                                 SEQUENCE {
            referenceCellIdentity           CellParametersID
        }
    },
    neighbourList                       NeighbourList                       OPTIONAL
}

UE-Positioning-OTDOA-Measurement-v390ext ::=            SEQUENCE {
    neighbourList-v390ext                       NeighbourList-v390ext
}


UE-Positioning-OTDOA-NeighbourCellInfo  ::= SEQUENCE {
    modeSpecificInfo    CHOICE  {
        fdd                             SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                             SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    ue-positioning-IPDL-Paremeters                  UE-Positioning-IPDL-Parameters
    OPTIONAL,
    sfn-SFN-RelTimeDifference           SFN-SFN-RelTimeDifference1,
    sfn-SFN-Drift                       SFN-SFN-Drift                       OPTIONAL,
    searchWindowSize                    OTDOA-SearchWindowSize,
    positioningMode     CHOICE{
        ueBased                                 SEQUENCE {
            relativeNorth                       INTEGER (-20000..20000)             OPTIONAL,
            relativeEast                        INTEGER (-20000..20000)             OPTIONAL,
            relativeAltitude                    INTEGER (-4000..4000)               OPTIONAL,
            fineSFN-SFN                         FineSFN-SFN,
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                       INTEGER (0.. 32766)                 OPTIONAL
        },
        ueAssisted                              SEQUENCE {}
    }
}

UE-Positioning-OTDOA-NeighbourCellInfo-r4  ::= SEQUENCE {
```

```
    modeSpecificInfo    CHOICE  {
        fdd                             SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                             SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    ue-positioning-IPDL-Paremeters                  UE-Positioning-IPDL-Parameters-r4
    OPTIONAL,
    sfn-SFN-RelTimeDifference           SFN-SFN-RelTimeDifference1,
    sfn-SFN-Drift                       INTEGER (0..30),
    searchWindowSize                    OTDOA-SearchWindowSize,
    positioningMode     CHOICE{
        ueBased                                 SEQUENCE {
            relativeNorth                       INTEGER (-20000..20000)             OPTIONAL,
            relativeEast                        INTEGER (-20000..20000)             OPTIONAL,
            relativeAltitude                    INTEGER (-4000..4000)               OPTIONAL,
            fineSFN-SFN                         FineSFN-SFN                         OPTIONAL,
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                       INTEGER (0.. 32766)                 OPTIONAL
        },
        ueAssisted                              SEQUENCE {}
    }
}

UE-Positioning-OTDOA-NeighbourCellInfo-UEB  ::= SEQUENCE {
    modeSpecificInfo    CHOICE  {
        fdd                             SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                             SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    ue-positioning-IPDL-Paremeters                  UE-Positioning-IPDL-Parameters
    OPTIONAL,
    sfn-SFN-RelTimeDifference           SFN-SFN-RelTimeDifference1,
    sfn-SFN-Drift                       SFN-SFN-Drift       OPTIONAL,
    searchWindowSize                    OTDOA-SearchWindowSize,
    relativeNorth                       INTEGER (-20000..20000)             OPTIONAL,
    relativeEast                        INTEGER (-20000..20000)             OPTIONAL,
    relativeAltitude                    INTEGER (-4000..4000)               OPTIONAL,
    fineSFN-SFN                         FineSFN-SFN,
    -- actual value = (IE value * 0.0625) + 876
    roundTripTime                       INTEGER (0.. 32766)                 OPTIONAL
}

UE-Positioning-OTDOA-NeighbourCellList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        UE-Positioning-OTDOA-NeighbourCellInfo

UE-Positioning-OTDOA-NeighbourCellList-UEB ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        UE-Positioning-OTDOA-NeighbourCellInfo-UEB

UE-Positioning-OTDOA-NeighbourCellList-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            UE-Positioning-OTDOA-NeighbourCellInfo-r4

UE-Positioning-OTDOA-Quality ::=            SEQUENCE {
    stdResolution                       BIT STRING (SIZE (2)),
    numberOfOTDOA-Measurements          BIT STRING (SIZE (3)),
    stdOfOTDOA-Measurements             BIT STRING (SIZE (5))
}

UE-Positioning-OTDOA-ReferenceCellInfo ::=          SEQUENCE {
    sfn                                 INTEGER (0..4095)
    OPTIONAL,
    modeSpecificInfo CHOICE {
        fdd                                     SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                                     SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
```

```
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    positioningMode CHOICE {
        ueBased                                 SEQUENCE {
            cellPosition                                ReferenceCellPosition   OPTIONAL,
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                       INTEGER (0..32766)              OPTIONAL
        },
        ueAssisted                              SEQUENCE {}
    },
    ue-positioning-IPDL-Paremeters              UE-Positioning-IPDL-Parameters  OPTIONAL
}

UE-Positioning-OTDOA-ReferenceCellInfo-r4 ::=   SEQUENCE {
    sfn                                 INTEGER (0..4095)
    OPTIONAL,
    modeSpecificInfo CHOICE {
        fdd                                     SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                                     SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    positioningMode CHOICE {
        ueBased                                 SEQUENCE {
            cellPosition                                ReferenceCellPosition   OPTIONAL,
            -- actual value = (IE value * 0.0625) + 876
            roundTripTime                       INTEGER (0..32766)              OPTIONAL
        },
        ueAssisted                              SEQUENCE {}
    },
    ue-positioning-IPDL-Paremeters              UE-Positioning-IPDL-Parameters-r4   OPTIONAL
}

UE-Positioning-OTDOA-ReferenceCellInfo-UEB ::=          SEQUENCE {
    sfn                                 INTEGER (0..4095)
    OPTIONAL,
    modeSpecificInfo CHOICE {
        fdd                                     SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info
        },
        tdd                                     SEQUENCE{
            cellAndChannelIdentity              CellAndChannelIdentity
        }
    },
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellPosition                                ReferenceCellPosition   OPTIONAL,
    -- actual value = (IE value * 0.0625) + 876
    roundTripTime                       INTEGER (0..32766)              OPTIONAL
    ue-positioning-IPDL-Paremeters              UE-Positioning-IPDL-Parameters  OPTIONAL
}


UE-Positioning-PositionEstimateInfo ::=                 SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE {
            referenceIdentity                   CellParametersID
        }
    }                                                               OPTIONAL,
    referenceTime                       CHOICE {
        utran-GPSReferenceTimeResult                UTRAN-GPSReferenceTimeResult,
        gps-ReferenceTimeOnly               INTEGER (0..604799999),
        cell-Timing                         SEQUENCE {
            sfn                                         INTEGER (0..4095),
            modeSpecificInfo CHOICE {
                fdd                                     SEQUENCE {
                    primaryCPICH-Info                   PrimaryCPICH-Info
                },
                tdd                                     SEQUENCE{
                    cellAndChannelIdentity              CellAndChannelIdentity
                }
    },
    referenceSFN                        ReferenceSFN        OPTIONAL,
```

```
    gps-tow-1msec                       GPS-TOW-1msec       OPTIONAL,
    gps-tow-rem-usec                    GPS-TOW-rem-usec    OPTIONAL,
    positionEstimate                    PositionEstimate
}

UE-Positioning-ReportCriteria ::=           CHOICE {
    ue-positioning-ReportingCriteria            UE-Positioning-EventParamList,
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    noReporting                         NULL
}

UE-Positioning-ReportingQuantity ::=        SEQUENCE {
    methodType                          UE-Positioning-MethodType,
    positioningMethod                   PositioningMethod,
    responseTimedummy                       UE-Positioning-ResponseTime,
-- This IE is not used in this version of the specification and should be ignored.
-- IE "dummy" should be removed in later versions of the message including this IE
    accuracy                            UE-Positioning-Accuracy                 OPTIONAL,
    gps-TimingOfCellWanted              BOOLEAN,
    multipleSetsdummy                       BOOLEAN,
-- This IE is not used in this version of the specification and should be ignored.
-- IE "dummy" should be removed in later versions of the message including this IE
    additionalAssistanceDataReq         BOOLEAN,
    environmentCharacterisation         EnvironmentCharacterisation         OPTIONAL
}



UE-Positioning-ReportingQuantity-v390ext ::=        SEQUENCE {
    vertical-Accuracy                           UE-Positioning-Accuracy }

UE-Positioning-ResponseTime ::=             ENUMERATED {
                                        s1, s2, s4, s8, s16,
                                        s32, s64, s128 }

UTRA-CarrierRSSI ::=                INTEGER (0..76)

UTRAN-GPS-DriftRate ::=             ENUMERATED {
                                    UTRAN-GPSDrift0, UTRAN-GPSDrift1, UTRAN-GPSDrift2, UTRAN-
                                    GPSDrift5, UTRAN-GPSDrift10, UTRAN-GPSDrift15, UTRAN-GPSDrift25,
                                    UTRAN-GPSDrift50, UTRAN-GPSDrift-1, UTRAN-GPSDrift-2, UTRAN-
                                    GPSDrift-5, UTRAN-GPSDrift-10, UTRAN-GPSDrift-15, UTRAN-
                                    GPSDrift-25, UTRAN-GPSDrift-50}

UTRAN-GPSReferenceTime ::=              SEQUENCE {
    gps-tow-1msec                       GPS-TOW-1msec,
    gps-tow-rem-usec                    GPS-TOW-rem-usec,
    utran-GPSTimingOfCell               INTEGER(0..2322431999999),
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info               OPTIONAL
        },
        tdd                                 SEQUENCE {
            referenceIdentity           CellParametersID                OPTIONAL
        }       OPTIONAL
    },
    sfn                                     INTEGER (0..4095)
}

..
UTRAN-GPSReferenceTimeResult ::=                SEQUENCE {
    ue-GPSTimingOfCell          INTEGER(0..37158911999999),
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            referenceIdentity                   PrimaryCPICH-Info
        },
        tdd                                 SEQUENCE {
            referenceIdentity           CellParametersID
        }
    },
    sfn                                     INTEGER (0..4095)
}

-- ************************************************
--
--     OTHER INFORMATION ELEMENTS (10.3.8)
--
```

```
-- **************************************************
..

SIB-Type ::=                        ENUMERATED {
                                        masterInformationBlock,
                                        systemInformationBlockType1,
                                        systemInformationBlockType2,
                                        systemInformationBlockType3,
                                        systemInformationBlockType4,
                                        systemInformationBlockType5,
                                        systemInformationBlockType6,
                                        systemInformationBlockType7,
                                        systemInformationBlockType8,
                                        systemInformationBlockType9,
                                        systemInformationBlockType10,
                                        systemInformationBlockType11,
                                        systemInformationBlockType12,
                                        systemInformationBlockType13,
                                        systemInformationBlockType13-1,
                                        systemInformationBlockType13-2,
                                        systemInformationBlockType13-3,
                                        systemInformationBlockType13-4,
                                        systemInformationBlockType14,
                                        systemInformationBlockType15,
                                        systemInformationBlockType15-1,
                                        systemInformationBlockType15-2,
                                        systemInformationBlockType15-3,
                                        systemInformationBlockType16,
                                        systemInformationBlockType17,
                                        systemInformationBlockType15-4,
                                        systemInformationBlockType18,
                                        schedulingBlock1,
                                        schedulingBlock2,
                                        systemInformationBlockType15-5,
                                        spare1, spare2, spare3 }

SIB-TypeAndTag ::=                  CHOICE {
    sysInfoType1                        PLMN-ValueTag,
    sysInfoType2                        CellValueTag,
    sysInfoType3                        CellValueTag,
    sysInfoType4                        CellValueTag,
    sysInfoType5                        CellValueTag,
    sysInfoType6                        CellValueTag,
    sysInfoType7                        NULL,
    sysInfoType8                        CellValueTag,
    sysInfoType9                        NULL,
    sysInfoType10                       NULL,
    sysInfoType11                       CellValueTag,
    sysInfoType12                       CellValueTag,
    sysInfoType13                       CellValueTag,
    sysInfoType13-1                     CellValueTag,
    sysInfoType13-2                     CellValueTag,
    sysInfoType13-3                     CellValueTag,
    sysInfoType13-4                     CellValueTag,
    sysInfoType14                       NULL,
    sysInfoType15                       CellValueTag,
    sysInfoType16                       PredefinedConfigIdentityAndValueTag,
    sysInfoType17                       NULL,
    sysInfoType15-1                     CellValueTag,
    sysInfoType15-2                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-3                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-4                     CellValueTag,
    sysInfoType18                       CellValueTag,
    sysInfoType15-5                     CellValueTag
}

SIBSb-TypeAndTag ::=                    CHOICE {
    sysInfoType1                        PLMN-ValueTag,
    sysInfoType2                        CellValueTag,
    sysInfoType3                        CellValueTag,
    sysInfoType4                        CellValueTag,
    sysInfoType5                        CellValueTag,
    sysInfoType6                        CellValueTag,
    sysInfoType7                        NULL,
    sysInfoType8                        CellValueTag,
    sysInfoType9                        NULL,
    sysInfoType10                       NULL,
    sysInfoType11                       CellValueTag,
```

```
    sysInfoType12                       CellValueTag,
    sysInfoType13                       CellValueTag,
    sysInfoType13-1                     CellValueTag,
    sysInfoType13-2                     CellValueTag,
    sysInfoType13-3                     CellValueTag,
    sysInfoType13-4                     CellValueTag,
    sysInfoType14                       NULL,
    sysInfoType15                       CellValueTag,
    sysInfoType16                       PredefinedConfigIdentityAndValueTag,
    sysInfoType17                       NULL,
    sysInfoTypeSB1                      CellValueTag,
    sysInfoTypeSB2                      CellValueTag,
    sysInfoType15-1                     CellValueTag,
    sysInfoType15-2                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-3                     SIBOccurrenceIdentityAndValueTag,
    sysInfoType15-4                     CellValueTag,
    sysInfoType18                       CellValueTag,
    sysInfoType15-5                     CellValueTag
}
..

SysInfoType15 ::=                   SEQUENCE {
    -- Measurement IEs

        ue-positioning-GPS-CipherParameters     UE-Positioning-CipherParameters     OPTIONAL,
        ue-positioning-GPS-ReferenceLocation    ReferenceLocation,
        ue-positioning-GPS-ReferenceTime        UE-Positioning-GPS-ReferenceTime,

        ue-positioning-GPS-Real-timeIntegrity       BadSatList                          OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType15-r3-r4-ext         SysInfoType15-r3-r4-ext-IEs,
        -- Extension mechanism for non- release4 information
            nonCriticalExtensions           SEQUENCE {}             OPTIONAL
        }                               OPTIONAL
}

SysInfoType15-r3-r4-ext-IEs ::= SEQUENCE {
    up-Ipdl-Parameters-TDD          UE-Positioning-IPDL-Parameters-TDD-r4-ext   OPTIONAL
}

SysInfoType15-1 ::=                 SEQUENCE {
    -- DGPS corrections
        ue-positioning-GPS-DGPS-Corrections         UE-Positioning-GPS-DGPS-Corrections,

    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}             OPTIONAL
}

SysInfoType15-2 ::=                 SEQUENCE {
-- Ephemeris and clock corrections
    transmissionTOW                 INTEGER (0..604799),
    satID                           SatID,
    ephemerisParameter              EphemerisParameter,

-- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}         OPTIONAL
}

SysInfoType15-3 ::=                 SEQUENCE {
    -- Almanac and other data
        transmissionTOW                 INTEGER (0.. 604799),
        ue-positioning-GPS-Almanac                  UE-Positioning-GPS-Almanac
    OPTIONAL,
        ue-positioning-GPS-IonosphericModel         UE-Positioning-GPS-IonosphericModel
    OPTIONAL,
        ue-positioning-GPS-UTC-Model                UE-Positioning-GPS-UTC-Model
    OPTIONAL,
        satMask                         BIT STRING (SIZE (1..32))   OPTIONAL,
        lsbTOW                          BIT STRING (SIZE (8))       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                 OPTIONAL
}

SysInfoType15-4 ::=                 SEQUENCE {
    -- Measurement IEs
        ue-positioning-OTDOA-CipherParameters   UE-Positioning-CipherParameters         OPTIONAL,
        ue-positioning-OTDOA-AssistanceData     UE-Positioning-OTDOA-AssistanceData,
```

```
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions       SEQUENCE {
            sysInfoType15-4-r4ext                   SysInfoType15-4-r4ext       OPTIONAL,
            nonCriticalExtensions       SEQUENCE {}
        }                       OPTIONAL
}

SysInfoType15-4-r4ext ::= SEQUENCE {
    ue-Positioning-OTDOA-AssistanceData-r4ext   UE-Positioning-OTDOA-AssistanceData-r4ext   OPTIONAL
}

SysInfoType15-5 ::=                 SEQUENCE {
    -- Measurement IEs
        ue-positioning-OTDOA-AssistanceData-UEB     UE-Positioning-OTDOA-AssistanceData-UEB,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions       SEQUENCE {
            sysInfoType15-5-r4ext                   SysInfoType15-5-r4ext       OPTIONAL,
            nonCriticalExtensions       SEQUENCE {}
        }                       OPTIONAL
}

..
```

13.4.32 VALUE_TAG

This variable contains information about the value tag for the last received system information block of a given type, for all system information blocks using value tags. The UE shall maintain one instance of this variable for the current selected cell. The UE may store several instances of this variable, one for each cell, to be used if the UE returns to these cells.

All IEs in this variable shall be cleared when switched off and as well as at selection of a new PLMN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MIB value tag	OP		MIB value tag 10.3.8.9	Value tag for the master information block
SB 1 value tag	OP		Cell value tag 10.3.8.4	Value tag for the scheduling block type 1
SB 2 value tag	OP		Cell value tag 10.3.8.4	Value tag for the scheduling block type 2
SIB 1 value tag	CV-*GSM*		PLMN value tag 10.3.8.10	Value tag for the system information block type 1
SIB 2 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 2
SIB 3 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 3
SIB 4 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 4
SIB 5 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 5
SIB 6 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 6
CHOICE *mode*	MP			
>FDD				
>>SIB 8 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 8
>TDD				(no data)
SIB 11 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 11
SIB 12 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 12
SIB 13 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13
SIB 13.1 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.1
SIB 13.2 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.2
SIB 13.3 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.3
SIB 13.4 value tag	CV-*ANSI*		Cell value tag 10.3.8.4	Value tag for the system information block type 13.4
SIB 15 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15
SIB 15.1 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.1
SIB 15.2 value tag list	OP	1 to <maxSat>		List of value tags for all stored occurrences of system information block type 15.2
>SIB 15.2 value tag	MP		Cell value tag 10.3.8.4	
>SIB occurrence identity and value tag	MP		SIB occurrence identity and value tag 10.3.8.20b	
SIB 15.3 value tag list	OP	1 to <maxSat>		List of value tags for all stored occurrences of system information block type 15.3
>SIB 15.3 value tag	MP		PLMN value tag 10.3.8.10	Value tag for the system information block type 15.3
>SIB occurrence identity and value tag	MP		SIB occurrence identity and value tag 10.3.8.20b	
SIB 15.4 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.4
SIB 15.5 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 15.4

SIB 16 value tag list	OP	1 to <maxPredefConfig>		List of value tags for all stored occurrences of the system information block type 16
>Predefined configuration identity and value tag	MP		Predefined configuration identity and value tag 10.3.8.11	
SIB 18 value tag	OP		Cell value tag 10.3.8.4	Value tag for the system information block type 18

Condition	Explanation
GSM	This information is optional when the PLMN Type in the variable SELECTED_PLMN is "GSM-MAP" and never stored otherwise.
ANSI	This information is optional when the PLMN Type in the variable SELECTED_PLMN is "ANSI-41" and never stored otherwise.

13.4.28a UE_POSITIONING_GPS_DATA

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GPS Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	
GPS Deciphering Keys	OP			
>Current deciphering key	MP		Bit string(56)	
>Next deciphering key	MP		Bit string(56)	
UE positioning GPS reference time	OP		UE positioning GPS reference time 10.3.7.96	
UE positioning GPS reference UE position	OP		Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	A priori knowledge of UE 3-D position.
UE positioning GPS DGPS corrections	OP		UE positioning GPS DGPS corrections 10.3.7.91	
UE positioning GPS navigation model	OP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	Satellite ID
>GPS Ephemeris and Clock Correction parameters	MP		UE positioning GPS Ephemeris and Clock Correction parameters 10.3.7.91a	
UE positioning GPS ionospheric model	OP		UE positioning GPS ionospheric model 10.3.7.92	
UE positioning GPS UTC model	OP		UE positioning GPS UTC model 10.3.7.97	
UE positioning GPS almanac	OP		~~UE positioning GPS almanac 10.3.7.89~~	
>SatID	MP	1 to <maxSat>		
>>WN_a	MP			
>>DataID	MP			Same as IE in 10.3.7.89
>>e	MP			Same as IE in 10.3.7.89
>>t_{oa}	MP			Same as IE in 10.3.7.89
>>δI	MP			Same as IE in 10.3.7.89
>>OMEGADOT	MP			Same as IE in 10.3.7.89
>>SV Health	MP			Same as IE in 10.3.7.89
>>$A^{1/2}$	MP			Same as IE in 10.3.7.89

>>OMEGA$_0$	MP			Same as IE in 10.3.7.89
>>M_0	MP			Same as IE in 10.3.7.89
>>ω	MP			Same as IE in 10.3.7.89
>>af_0	MP			Same as IE in 10.3.7.89
>>af_1	MP			Same as IE in 10.3.7.89
>SV Global Health	OP			Same as IE in 10.3.7.89
UE positioning GPS acquisition assistance	OP		UE positioning GPS acquisition assistance 10.3.7.88	
UE positioning GPS real-time integrity	OP		UE positioning GPS real-time integrity 10.3.7.95	
UE positioning GPS reference cell info	OP		UE positioning GPS reference cell info 10.3.7.95a	

13.4.28b UE_POSITIONING_OTDOA_DATA_UE_ASSISTED

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~OTDOA Data ciphering info~~	~~OP~~		~~UE positioning Ciphering info 10.3.7.86~~	
UE positioning OTDOA reference cell info for UE-assisted	OP		UE positioning OTDOA reference cell info 10.3.7.108	
UE positioning OTDOA neighbour cell list for UE-assisted	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-assisted	MP		UE positioning OTDOA neighbour cell info 10.3.7.106	

13.4.28c UE_POSITIONING_OTDOA_DATA_UE_BASED

Information Element/Group name	Need	Multi	Type and reference	Semantics description
OTDOA Deciphering Keys	OP			
>Current deciphering key	MP		Bit string(56)	
>Next deciphering key	MP		Bit string(56)	
OTDOA Data ciphering info	OP		UE positioning Ciphering info 10.3.7.86	
UE positioning OTDOA reference cell info for UE-based	OP		UE positioning OTDOA reference cell info for UE-based 10.3.7.108a	
UE positioning OTDOA neighbour cell list for UE-based	OP	1 to <maxCellMeas>		
>UE positioning OTDOA neighbour cell info for UE-based	MP		UE positioning OTDOA neighbour cell info for UE-based 10.3.7.106	

14.7 UE positioning measurements

14.7.1 UE positioning measurement quantities

The quantity to measure for UE positioning is dependent on the positioning method and the method type requested in the IE "UE positioning reporting quantity".

1 SFN-SFN observed time difference type 2, mandatory.

2 Rx-Tx time difference type 2, optional.

3 GPS timing of cell fames, optional.

The definition of other GPS measurements is not within the scope of this specification.

14.7.2 Void

14.7.3 UE positioning reporting events

In the IE "UE positioning reporting criteria" ~~field~~ in the Measurement Control messages, the UTRAN notifies the UE of which events should trigger a measurement report. UE positioning reporting events that can trigger a report are given below. The content of the measurement report is dependant on the ~~location~~ positioning method and method type requested in the IE "UE positioning reporting quantity" of the Measurement Control message and is described in detail in [18].

14.7.3.1 Reporting Event 7a: The UE position changes more than an absolute threshold

This event is used for UE-based methods only.

When this event is ordered by UTRAN in a measurement control message, the UE shall

- ~~-~~send a measurement report when the UE changes its position compared to the last reported position more than the~~a~~ predefined threshold defined by the IE "Threshold position change";~~. This event is used for UE-based methods only.~~

- act as specified in section 8.6.7.19.1b;

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,

  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,

  - delete this event from the list of events in variable MEASUREMENT_IDENTITY.

14.7.3.2 Reporting Event 7b: SFN-SFN measurement changes more than an absolute threshold

When this event is ordered by UTRAN in a measurement control message, the UE shall:

- send a measurement report when the SFN-SFN time difference measurement type 2 of any measured cell changes more than the threshold defined by the IE "Threshold SFN-SFN change", and - if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE based”,

  - act as specified in section 8.6.7.19.1b;

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted”,

  - act as specified in section 8.6.7.19.1a;

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”,

  - the UE may choose to either act according to section 8.6.7.19.1a or 8.6.7.19.1b.

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,

  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,

  - delete this event from the list of events in variable MEASUREMENT_IDENTITY.

~~send a measurement report when the SFN-SFN time difference measurement of any measured cell changes more than a predefined threshold. This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~

14.7.3.3 Reporting Event 7c: GPS time and SFN time have drifted apart more than an absolute threshold

When this event is ordered by UTRAN in a measurement control message, the UE shall:

~~send a measurement report when the GPS Time Of Week and the SFN timer have drifted apart more than a predefined threshold. This event is primarily used for UE-assisted methods, but can be used also for UE-based methods.~~

- send a measurement report when the GPS Time Of Week and the SFN timer have drifted apart more than the threshold defined by the IE "Threshold SFN-GPS TOW", and

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE based”,

  - act as specified in section 8.6.7.19.1b;

- if UTRAN set IE “Method Type” in “UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted”,

  - act as specified in section 8.6.7.19.1a;

- if UTRAN set IE “Method Type” in UE positioning reporting quantity” in the MEASUREMENT CONTROL message to “UE assisted preferred but UE based allowed” or “UE based preferred but UE assisted allowed”,

  - act as specified in section 8.6.7.19.1a or in section 8.6.7.19.1b depending on the method type chosen by the UE.

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is greater than one,

  - decrease IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event by one;

- if the value of IE “Amount of Reporting” in variable MEASUREMENT_IDENTITY for this event is equal to one,

  - delete this event from the list of events in variable MEASUREMENT_IDENTITY.

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26- 30 November, 2001

R2-012730

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1202** ⌘ ev **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Invalid RRC CONNECTION REJECT
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	November 26, 2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ If there is a protocol error caused by the reception of the RRC CONNECTION REJECT message, it is very likely that the UE will not be able to read some of the IEs included in the message, e.g. the IE "Wait time". Moreover, the value of the IE "Wait time" may be corrupted because of the protocol error. No clear benefit is provided by the use of wait time for the case in which there is a protocol error. In fact such errors should be very unlikely.

Summary of change: ⌘ The UE shall not use the value of the IE "Wait time" included in the RRC CONNECTION REJECT message in case the message causes a protocol error. The UE shall simply transmit a new RRC CONNECTION REQUEST if the value of counter V300 is equal to or smaller than N300.

Isolated Impact Change Analysis.

This change affects the timing of retransmission of the RRC CONNECTION REJECT message.

It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ Unnecessarily complicated UE implementation would be caused by the fact that the UE would have to peek into the message also in case the message violates ASN.1 encoding.

Clauses affected: ⌘ 8.1.3.10

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.331 v4.2.1, CR 1203
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

How to create CRs using this form:
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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.3.10 Invalid RRC CONNECTION REJECT message

If the UE receives an RRC CONNECTION REJECT message which contains an IE "Initial UE identity" with a value which is identical to the value of the IE "Initial UE identity" in the most recent RRC CONNECTION REQUEST message sent by the UE; but the RRC CONNECTION REJECT message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

The UE shall:

~~- if the IE "wait time" is <> 0, and:~~

- if V300 is equal to or smaller than N300: [Editor's note: changed indentation]

  ~~- wait for the time stated in the IE "wait time";~~

  - set the variable PROTOCOL_ERROR_INDICATOR to TRUE; [Editor's note: changed indentation]

  - set the IEs in the RRC CONNECTION REQUEST message according to subclause 8.1.3.3; [Editor's note: changed indentation]

  - perform the mapping of the Access Class to an Access Service Class as specified in subclause 8.5.13, and apply the given Access Service Class when accessing the RACH; [Editor's note: changed indentation]

  - submit a new RRC CONNECTION REQUEST message to the lower layers for transmission on the uplink CCCH; [Editor's note: changed indentation]

  - increment counter V300; [Editor's note: changed indentation]

  - restart timer T300 when the MAC layer indicates success or failure to transmit the message; [Editor's note: changed indentation]

- if V300 is greater than N300: [Editor's note: changed indentation]

  - enter idle mode; [Editor's note: changed indentation]

  - perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode; [Editor's note: changed indentation]

  - consider the procedure to be successful; [Editor's note: changed indentation]

  - the procedure ends. [Editor's note: changed indentation]

~~- if the IE "wait time" is = 0:~~

~~- enter idle mode;~~

~~- perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode;~~

~~- consider the procedure to be successful;~~

~~- the procedure ends.~~

[…]

3GPP TSG-RAN WG2 Meeting #25 **R2-012731**
Makuhari, Japan, 26- 30 November, 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1203** ⌘ ev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Invalid RRC CONNECTION REJECT
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	November 26, 2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ If there is a protocol error caused by the reception of the RRC CONNECTION REJECT message, it is very likely that the UE will not be able to read some of the IEs included in the message, e.g. the IE "Wait time". Moreover, the value of the IE "Wait time" may be corrupted because of the protocol error. No clear benefit is provided by the use of wait time for the case in which there is a protocol error. In fact such errors should be very unlikely.

Summary of change: ⌘ The UE shall not use the value of the IE "Wait time" included in the RRC CONNECTION REJECT message in case the message causes a protocol error. The UE shall simply transmit a new RRC CONNECTION REQUEST if the value of counter V300 is equal to or smaller than N300.

Isolated Impact Change Analysis.

This change affects the timing of retransmission of the RRC CONNECTION REJECT message.

It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ Unnecessarily complicated UE implementation would be caused by the fact that the UE would have to peek into the message also in case the message violates ASN.1 encoding.

Clauses affected: ⌘ 8.1.3.10

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.331 v3.8.0, CR 1202r1
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.3.10 Invalid RRC CONNECTION REJECT message

If the UE receives an RRC CONNECTION REJECT message which contains an IE "Initial UE identity" with a value which is identical to the value of the IE "Initial UE identity" in the most recent RRC CONNECTION REQUEST message sent by the UE; but the RRC CONNECTION REJECT message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

The UE shall:

~~- if the IE "wait time" is <> 0, and:~~

- if V300 is equal to or smaller than N300: [Editor's note: changed indentation]

  ~~- wait for the time stated in the IE "wait time";~~

  - set the variable PROTOCOL_ERROR_INDICATOR to TRUE; [Editor's note: changed indentation]

  - set the IEs in the RRC CONNECTION REQUEST message according to subclause 8.1.3.3; [Editor's note: changed indentation]

  - perform the mapping of the Access Class to an Access Service Class as specified in subclause 8.5.13, and apply the given Access Service Class when accessing the RACH; [Editor's note: changed indentation]

  - submit a new RRC CONNECTION REQUEST message to the lower layers for transmission on the uplink CCCH; [Editor's note: changed indentation]

  - increment counter V300; [Editor's note: changed indentation]

  - restart timer T300 when the MAC layer indicates success or failure to transmit the message; [Editor's note: changed indentation]

- if V300 is greater than N300: [Editor's note: changed indentation]

  - enter idle mode; [Editor's note: changed indentation]

  - perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode; [Editor's note: changed indentation]

  - consider the procedure to be successful; [Editor's note: changed indentation]

  - the procedure ends. [Editor's note: changed indentation]

~~- if the IE "wait time" is = 0:~~

~~- enter idle mode;~~

~~- perform the actions specified in subclause 8.5.2 when entering idle mode from connected mode;~~

~~- consider the procedure to be successful;~~

~~- the procedure ends.~~

[…]

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th – 30th November, 2001

Tdoc R2-012752

CR-Form-v3

CHANGE REQUEST

⌘ **25.331 CR 1213** ⌘ rev **r1** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Security baseline for corrections
Source:	⌘	Security drafting group
Work item code:	⌘	TEI
Date:	⌘	2001-11-30
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ These are clarifications that are needed in order to clearly interpret the specification of security for both UE and UTRAN.

Summary of change: ⌘

- Revision 1:This document is based on Ericsson R2-012600 and is updated to include the results and conclusions of the security related discussions in the early part of the week for this meeting (RAN2#25). This document will be used as a base from which one CR on security can be written for approval to RAN2#25. This tdoc includes all agreed changes from the security drafting group, using different tracking user names to follow the changes. The document is distributed with the Word tracking option "Highlight changes on screen" as OFF. The complete changes can be seen easily in cyan (light blue).
- Revision 2: Included comments on Revision 1 from the Security drafting group.

8.1.3.6

Default setting THRESHOLD defined.

8.1.4.6 and 8.1.6.6

RRC SN is now incremented on retransmission

8.1.12.2.1

Clarified that the IE START may be used as well as the START list

Clarification of behaviour when SRB and RB are suspended.

8.1.12.2.2

Removed the indication to higher layers. This is now sent when we receive the

SECURITY MODE COMPLETE. Moved to 8.1.12.5

8.1.12.3

Text restructured and IE specific parts moved to 8.3.6.4 and 8.3.6.5.

Redundant UE variable “Historical Status” is removed.

Procedures relating to reception of new keys is moved to a new section 8.1.12.3.

8.1.12.4c

Reset of IE reconfiguration added.

8.1.12.5

Resumption of RB and indication of new security configuration to upper layers now included in this section.

8.1.15.1

Clarification of how RB COUNT-C values are to be handled.

8.2.2.3

IE name corrected to “Uplink integrity protection activation info”, and exclusion of default now removed.

8.2.2.4

Correction to include RB4 in general SRB procedures.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.2.2.5

Clarification of UTRAN behaviour when response received and ciphering configuration has been ordered.

8.3.1.6

Text added to describe restart of ciphering on TM RB on transition to CELL_DCH state.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.3.3

IE name corrected to “Uplink integrity protection activation info”, and exclusion of default now removed.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.4.3.

IE name corrected to “Uplink integrity protection activation info”, and exclusion of

default now removed.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.6.3

Clarification of when to apply ciphering on reception of HANDOVER TO UTRAN COMMAND

8.5.2

It is clarified that the START value stored in the USIM should not exceed THRESHOLD

8.5.9

Clarification of which RB COUNT values are used in the calculation of START.

8.5.10

UTRAN shall changed to should

In all cases RRC SN is now increamented the text allowing exceptions is removed.

8.5.10.1

References to other sections that caused “cylic” procedures removed.

8.5.10.2

Clarification about when UTRAN will apply integrity configurations

8.6.3.4

Text restructured and invalid configuration checking grouped.

New invalid configurations added.

Handling of LATEST_CONFIGURED_CN_DOMAIN corrected.

Clarification of how to apply ciphering configuration changes to TM RB

8.6.3.5

Text restructured and invalid configuration checking grouped.

Initialisation of HFN move to 8.1.12.3

New invalid configuration checks added

It is clarified which message commands can be receieved in different message types.

8.6.4.1

TM SRB text removed

		8.6.4.3 Clarification of when to start incrementing COUNT-C values. Removed refernce to COUNT-I which is not affected by this procedure. 13.4.10 Redundant IE deleted. **Isolated impact**: The CR has isolated impact; only the function to be corrected is affected.
Consequences if not approved:	⌘	The possibility that different UE and UTRAN implementations will interpret the specification of security differently.

Clauses affected:	⌘	8.1.3.6, 8.1.4.6, 8.1.6.6, 8.1.12.1, 8.1.12.2.1, 8.1.12.2.2, 8.1.12.3, 8.1.12.3.1 (new), 8.1.12.4a, 8.1.12.4b, 8.1.12.4c, 8.1.12.5, 8.1.12.6, 8.1.15.1, 8.2.2.3, 8.2.2.4, 8.2.2.5, 8.3.1.6, 8.3.3.3, 8.3.4.3, 8.3.6.3, 8.5.2, 8.5.9, 8.5.10, 8.5.10.1, 8.5.10.2, 8.6.3.4, 8.6.3.5, 8.6.4.1, 8.6.4.2, 8.6.4.3, 8.6.4.8, 8.6.5.1, 10.2.34, 13.4.10		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1214
Other comments:	⌘			

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

SECTIONS INCLUDED IN THIS CR

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause 8.5.17;
    - select Secondary CCPCH according to subclause 8.5.19;
- perform the physical layer synchronization procedure as specified in [29];
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - if the USIM is present:
    - set the "START" for each CN domain in the IE "START list" in the RRC CONNECTION SETUP COMPLETE message with the corresponding START value that is stored in the USIM [50]; and then
    - set the START value stored in the USIM [50] for any CN domain to the value "THRESHOLD" of the variable START_THRESHOLD;
  - if the USIM is not present:
    - set the "START" for each CN domain in the IE "START list" in the RRC CONNECTION SETUP COMPLETE message to zero;
    - set the value of "THRESHOLD" in the variable "START_THRESHOLD" to the default value [40].
  - retrieve its UTRA UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED; and then
  - include this in IE "UE radio access capability" and IE "UE radio access capability extension", provided this IE is included in variable UE_CAPABILITY_REQUESTED;
  - retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED; and then
  - include this in IE "UE system specific capability".

When the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:
  - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- store the contents of the variable UE_CAPABILITY_REQUESTED in the variable UE_CAPABILITY_TRANSFERRED;
- initialise variables upon entering UTRA RRC connected mode as specified in subclause 13.4;
- consider the procedure to be successful;

And the procedure ends.

8.1.4.6 Expiry of timer T308, unacknowledged mode transmission

When in state CELL_DCH and the timer T308 expires, the UE shall:

- increment V308 by one;
- if V308 is equal to or smaller than N308:
  - prior to retransmitting the RRC CONNECTION RELEASE COMPLETE message:
    - if the IE “Status” in the variable INTEGRITY_PROTECTION_INFO has the value “Started":
      - include the same IEs as in the last unsuccessful attempt of this message, except for the IE “Integrity check info”, which is modified as follows;
        - increment the "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO by one;
        - set the IE “RRC Message sequence number” in the IE “Integrity check info” by the value of the "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO in this message;
        - recalculate the IE “Message authentication code” in the IE “Integrity check info” in this message, in accordance with subclause 8.5.10.3;
    - else
      - include the same IEs as in the last unsuccessful attempt of this message~~, except the IE “Integrity check info”~~;
  - ~~retransmit~~ send the RRC CONNECTION RELEASE COMPLETE message on signalling radio bearer RB1;~~, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO;~~
- if V308 is greater than N308:
  - release all its radio resources;
  - indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;

- perform the actions specified in subclause 8.5.2 when entering idle mode;
- and the procedure ends.

8.1.6.6 T304 timeout

Upon expiry of timer T304, the UE shall check the value of V304 and:

- if V304 is smaller than or equal to N304:
  - prior to retransmitting the UE CAPABILITY INFORMATION message:
    - if the IE “Status” in the variable INTEGRITY_PROTECTION_INFO has the value “Started":
      - include the same IEs as in the last unsuccessful attempt of this message, except for the IE “Integrity check info”, which is modified as follows;
        - increment the "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO by one;
        - set the IE “RRC Message sequence number” in the IE “Integrity check info” by the value of the "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO in this message;
        - recalculate the IE “Message authentication code” in the IE “Integrity check info” in this message, in accordance with subclause 8.5.10.3;
    - else
      - include the same IEs as in the last unsuccessful attempt of this message~~, except the IE “Integrity check info”~~;
  - ~~retransmit~~ send ~~a~~ the UE CAPABILITY INFORMATION message on signalling radio bearer RB2;~~with the IEs as set in the last unsuccessful attempt, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO;~~
  - restart timer T304;
  - increment counter V304;
- if V304 is greater than N304:
  - initiate the Cell update procedure as specified in subclause 8.3.1, using the cause "Radio link failure".

8.1.12 Security mode control

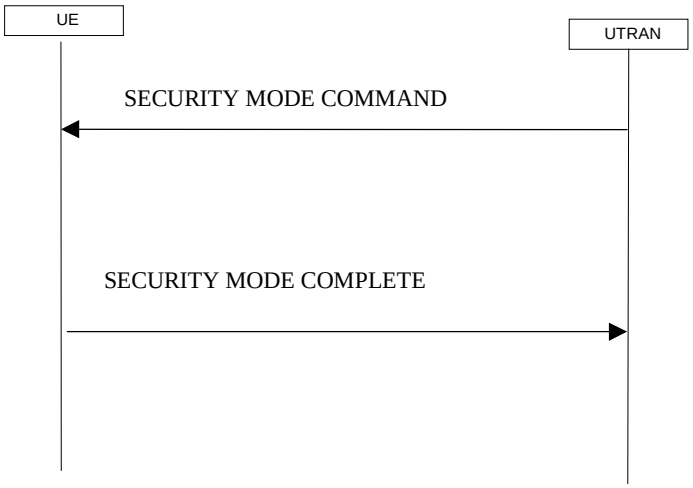

Figure 18: Security mode control procedure

8.1.12.1 General

The purpose of this procedure is to trigger the stop or start of ciphering or to command the restart of the ciphering with a new ciphering configuration, for ~~all~~ the radio bearers of one CN domain and for all signalling radio bearers.

It is also used to start integrity protection or to modify the integrity protection configuration for all signalling radio bearers.

8.1.12.2 Initiation

8.1.12.2.1 Ciphering configuration change

To stop or start/restart ciphering, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the most recent ciphering configuration. If no such ciphering configuration exists then the SECURITY MODE COMMAND is not ciphered.

Prior to sending the SECURITY MODE COMMAND, for the CN domain indicated in the IE "CN domain identity" in the SECURITY MODE COMMAND, UTRAN should:

- if this is the first SECURITY MODE COMMAND sent for this RRC connection:
  - use the value "START" in the most recently received IE "START list" or IE "START" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
    - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
    - setting the remaining bits of the hyper frame numbers equal to zero;
- suspend all radio bearers using RLC-AM ~~and~~ or RLC-UM ~~for this CN domain~~;
- suspend all signalling radio bearers using RLC-AM ~~and~~ or RLC-UM, except the signalling radio bearer used to send the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM;
- not transmit RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info" on all suspended radio bearers and all suspended signalling radio bearers;
- apply the old ciphering configuration for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info" included in the IE "Ciphering mode info";

- apply the new ciphering configuration for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info" included in the IE "Ciphering mode info".

- set, for the signalling radio bearer used to send the SECURITY MODE COMMAND, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;

- if a transparent mode radio bearer for this CN domain exists then ~~and the UE is in CELL_DCH state~~ include the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info" ~~when a DPCH exists and is used for radio bearers using transparent mode RLC~~, at which time the new ciphering configuration shall be applied;

- set, for each suspended radio bearer and signalling radio bearer that has no pending ciphering activation time set by a previous security mode control procedure, an "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;

- set, for each suspended radio bearer and signalling radio bearer that has a pending ciphering activation time set by a previous security mode control procedure, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info" to the value used in the previous security mode control procedure, at which time the latest ciphering configuration shall be applied.

- transmit the SECURITY MODE COMMAND message on the downlink DCCH in AM RLC;

~~While suspended, radio bearers and signalling radio bearers shall not deliver RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info".~~

~~When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN shall:~~

- ~~resume all the suspended radio bearers and signalling radio bearers. The old ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info", as sent to the UE. The new ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info", sent to the UE.~~

8.1.12.2.2 Integrity protection configuration change

To start or modify integrity protection, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the new integrity protection configuration.

~~When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN should:~~

- ~~for the signalling radio bearers:~~

  - ~~send an indication to upper layers that the new integrity protection configuration has been activated when the activation time has elapsed.~~

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall ~~perform the actions for the received information elements according to subclause 8.6.~~:

If the IE "Ciphering mode info" and the IE "Integrity protection mode info" are both not included in the SECURITY MODE COMMAND, ~~the UE shall~~:

- set the variable INVALID_CONFIGURATION to TRUE.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, ~~the UE shall~~:

- set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";

- if ~~prior to the reception of SECURITY MODE COMMAND, the value of the IE "Status" in the variable "CIPHERING_STATUS" of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is~~

"Not started" and the value of the IE "Historical statusStatus" in the variable "INTEGRITY_PROTECTION_INFO" is "Never been activeNot started":

- use the value "START" in the most recently sent IE "START list" or IE "START" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
  - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
  - setting the remaining bits of the hyper frame numbers equal to zero;

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to transmit the SECURITY MODE COMPLETE message on the uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity"; and

- set the "RLC send sequence number" in IE "Radio bearer uplink ciphering activation time info", at which time the new ciphering configuration shall be applied;

- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry; Note: Indentation changed to B2
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":

  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;

  - perform the actions as specified in subclause 8.6.3.4;

- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info": with the IE "Integrity protection mode command" set to "Modify":

  - if the IE "Integrity protection mode command" is set to "Modify":

    - include and set the IE "Integrity Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO; Note: Indentation changed to B3

  - perform the actions as specified in subclause 8.5.10.18.6.3.5;

- for radio bearers using RLC-TM:

  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;

  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;

- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

Prior to sending the SECURITY MODE COMPLETE message, set the information elements as specified below:

- use the old ciphering configuration for this message;
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
  - include the IE "Radio bearer uplink ciphering activation time info";
- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":
  - include the IE "Uplink integrity protection activation info";

- start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message;

- transmit the SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC;

- send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations; Note: Indentation changed to B1

- if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message: Note: Indentation changed to B1

- start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message; Note: Indentation changed to B2

- wWhen the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:;

- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":

- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":

- allow the transmission of RRC messages on all signalling radio bearers with RRC SN greater than or equal to the value in the "RRC message sequence number list" indicated for each signalling radio bearer in the IE "Uplink integrity protection activation info" of the response message;

- set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and

- clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- the procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;

- notify upper layers upon change of the security configuration;

- and the procedure ends.

[NOTE: TEXT ON NEW KEYS HAS BEEN MOVED TO A NEW CHAPTER]

- if a new security key set has been received for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN:

- set the START value for this CN domain to 0.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received:

- in the downlink:

- use the new key;

- set the IE "Downlink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero when the RRC sequence number in a received RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

- in the uplink:
  - use the new key;
  - set the IE "Uplink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero when the RRC sequence number in a transmitted RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Uplink integrity protection activation info";

- if a new ciphering key is available:
  - for radio bearers using RLC-TM:
    - use the new key in uplink and downlink;
    - set the HFN component of the COUNT-C to zero at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
  - for radio bearers using RLC-AM and RLC-UM:
    - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
      - use the new key;
      - set the HFN component of the downlink COUNT-C to zero;
    - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
      - use the new key;
      - set the HFN component of the uplink COUNT-C to zero.

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or if the IE "GSM security capability" is not included in the SECURITY MODE COMMAND and is included in the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- and the procedure ends.

8.1.12.3.1 New ciphering and integrity protection keys [NEW SECTION]

It should be noted that UTRAN should apply and use the same rules as specified in this subclause for the UE below in order to ensure that the change to the new security configuration is done in a correct and synchronised way between UE and UTRAN.

If a new security keyset (new ciphering and integrity protection keys) has been received from the upper layers [40] for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, the UE shall:

- set the START value for this CN domain to zero;
- for each signalling radio bearer, the UE shall:

- for integrity protection in the downlink:
  - ~~when the RRC sequence number in a received RRC message for this signalling radio bearer is equal to one less than or greater than the activation time minus one, where the activation time is as indicated in IE "Downlink integrity protection activation info" as included in the IE "Integrity protection mode info":~~
    - ~~if a pending activation time exists for this signalling radio bearer~~
      - ~~release the old integrity protection configuration for this signalling radio bearer;~~
  - when the RRC sequence number in a received RRC message for this signalling radio bearer ~~is not less than~~ is equal to or greater than the activation time as indicated in IE "Downlink integrity protection activation info" as included in the IE "Integrity protection mode info" ~~(ie the new integrity key is used for the first time)~~:
    - use the new integrity key;
    - for this signalling radio bearer, set the IE "Downlink RRC HFN" in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero;
- for integrity protection in the uplink:
  - ~~when the RRC sequence number in a received RRC message for this signalling radio bearer is equal to one less than the activation time minus one, where the activation time is as indicated in IE "Uplink integrity protection activation info" as included in the IE "Integrity protection mode info" (ie the new integrity key is used for the first time):~~
    - ~~release the old integrity protection configuration for this signalling radio bearer;~~
  - when the RRC sequence number in a to be ~~received~~transmitted RRC message for this signalling radio bearer is ~~not less than~~ equal to the activation time as indicated in IE "Uplink integrity protection activation info" included in the IE "Integrity protection mode info"
    - use the new integrity key;
    - for this signalling radio bearer, set the IE "Uplink RRC HFN" in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero;

- for each signalling radio bearer and for each radio bearer~~, the UE shall~~for this CN domain:
  - if the IE “Status” in the variable CIPHERING_STATUS has the value “Started” for this CN domain, then for ciphering on radio bearers using RLC-TM:
    - at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info":
      - use the new key in uplink and downlink;
      - set the HFN component of the COUNT-C to zero;
  - if the IE “Status” in the variable CIPHERING_STATUS has the value “Started” for this CN domain, then for ciphering on radio bearers and signalling radio bearers using RLC-AM and RLC-UM:
    - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
      - use the new key;
      - set the HFN component of the downlink COUNT-C to zero;
    - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
      - use the new key;
      - set the HFN component of the uplink COUNT-C to zero.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE COMMAND message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC, using the ciphering and integrity protection configurations prior to the reception of this SECURITY MODE COMMAND;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the response message has been submitted to lower layers for transmission:

~~- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - and the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE COMMAND message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC, using the ciphering and integrity protection configurations prior to the reception of this SECURITY MODE COMMAND;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the response message has been submitted to lower layers for transmission:

- ~~when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - the procedure ends.

8.1.12.4c Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE due to the received SECURITY MODE COMMAND message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the DCCH using AM RLC after setting the IEs as specified below;
  - set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "invalid configuration";
- when the response message has been submitted to lower layers for transmission:

- ~~when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - set the variable INVALID_CONFIGURATION to FALSE;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE~~ for the CN domain as indicated in the LATEST_CONFIGURED_CN_DOMAIN~~;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - and the procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN ~~shall~~should:

- send an indication to upper layers that the new integrity protection configuration has been activated;
- resume in the downlink, all suspended radio bearers and all signalling radio bearers;
- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;

- use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;

- if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;

- for radio bearers using RLC-TM:

  - use the old ciphering configuration for the received RLC PDUs before the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;

  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;

- and the procedure ends.

8.1.12.6 Invalid SECURITY MODE COMMAND message

If the SECURITY MODE COMMAND message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;

- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Rejected transactions" in the variable TRANSACTIONS; and

- clear that entry;

- set the IE "failure cause" to the cause value "protocol error";

- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.

- when the response message has been submitted to lower layers for transmission:

~~- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;

  - and the procedure ends.

8.1.15 Counter check procedure

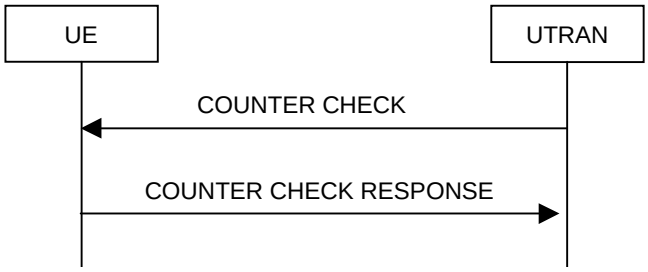

Figure 21: Counter check procedure

8.1.15.1 General

The counter check procedure is used by the UTRAN to perform a local authentication. The purpose of the procedure is to check that the amount of data sent in both directions (uplink and downlink) over the duration of the RRC connection is identical at the UTRAN and at the UE (to detect a possible intruder – a 'man-in-the-middle' – from operating).

This procedure is only applicable to radio bearers, and only to radio bearers using RLC-AM ~~and~~or RLC-UM. It should be noted that this requires that the COUNT-C values for each UL and DL radio bearers using RLC-AM ~~and~~or RLC-UM continue to be incremented even if ciphering is not used. This procedure is not applicable to signalling radio bearers.

~~It should be noted that this requires that the COUNT-C values for each UL and DL radio bearer are maintained even if ciphering is not used. This procedure is only applicable to radio bearers using UM or AM mode of RLC. In this version, this procedure is not applied for radio bearers using transparent mode RLC.~~

8.1.15.2 Initiation

The UTRAN monitors the COUNT-C value associated with each radio bearer using UM or AM RLC. The procedure is triggered whenever any of these values reaches a critical checking value. The granularity of these checking values and the values themselves are defined to the UTRAN by the visited network. The UTRAN initiates the procedure by sending a COUNTER CHECK message on the downlink DCCH.

8.1.15.3 Reception of a COUNTER CHECK message by the UE

When the UE receives a COUNTER CHECK message it shall compare the COUNT-C MSB values received in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message to the COUNT-C MSB values of the corresponding radio bearers.

The UE shall:

- set the IE "RRC transaction identifier" in the COUNTER CHECK RESPONSE message to the value of "RRC transaction identifier" in the entry for the COUNTER CHECK message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.

If

- there is one or more radio bearer(s) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS, which is (are) not included in the IE "RB COUNT-C MSB information"; or
- there is one or more radio bearer(s) included in the IE "RB COUNT-C MSB information", which is (are) not stored in the variable ESTABLISHED_RABS; or
- for any radio bearer (excluding signalling radio bearers) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS and included in the IE "RB COUNT-C MSB information" with COUNT-C MSB values different from the MSB part of the COUNT-C values in the UE

the UE shall:

- include these radio bearers in the IE "RB COUNT-C information" in the COUNTER CHECK RESPONSE message. For any RB which is included in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message but not stored in the variable ESTABLISHED_RABS in the UE, the MSB part of COUNT-C values in the COUNTER CHECK RESPONSE message shall be set identical to COUNT-C-MSB values in the COUNTER CHECK message. The LSB part shall be filled by 0s;

The UE shall:

- submit a COUNTER CHECK RESPONSE message to lower layers for transmission on the uplink DCCH using AM RLC.

When the COUNTER CHECK RESPONSE message has been submitted to lower layers for transmission the procedure ends.

8.1.15.4 Reception of the COUNTER CHECK RESPONSE message by UTRAN

If the UTRAN receives a COUNTER CHECK RESPONSE message that does not contain any COUNT-C values, the procedure ends.

If the UTRAN receives a COUNTER CHECK RESPONSE message that contains one or several COUNT-C values the UTRAN may release the RRC connection.

8.1.15.5 Cell re-selection

If the UE performs cell re-selection anytime during this procedure it shall, without interrupting the procedure:

- initiate the cell update procedure according to subclause 8.3.1.

8.1.15.6 Invalid COUNTER CHECK message

If the UE receives a COUNTER CHECK message, which contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit an RRC STATUS message on the uplink DCCH using AM RLC;
- include the IE "Identification of received message"; and
- set the IE "Received message type" to COUNTER CHECK; and
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the UE COUNTER CHECK message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry;
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- when the RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid COUNTER CHECK message has not been received.

8.2 Radio Bearer control procedures

8.2.1 Radio bearer establishment

See subclause 8.2.2 Reconfiguration procedures.

8.2.2 Reconfiguration procedures

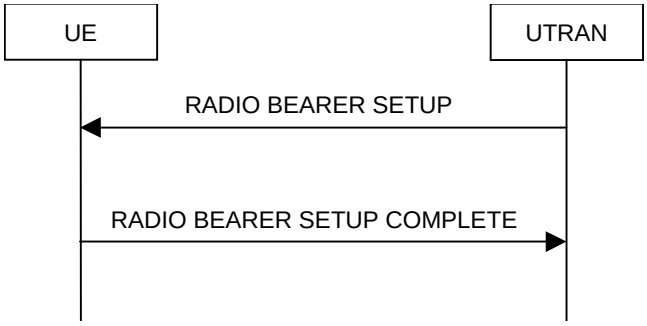

Figure 22: Radio Bearer Establishment, normal case

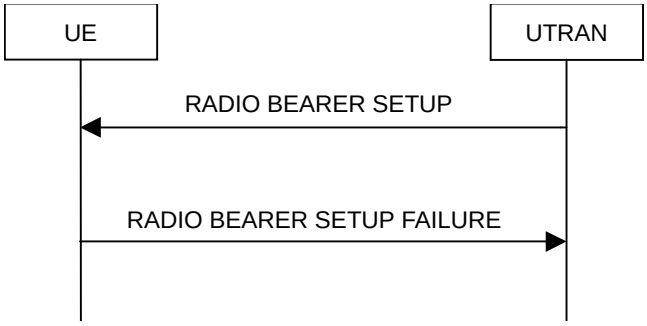

Figure 23: Radio Bearer Establishment, failure case

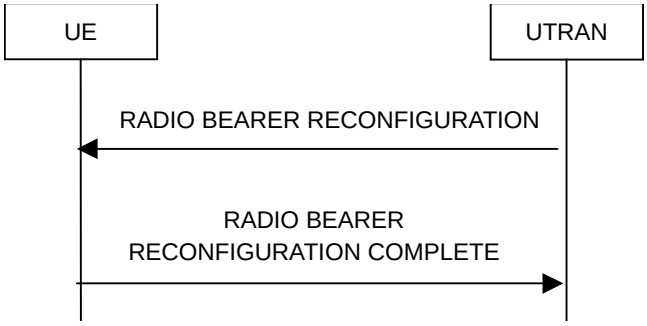

Figure 24: Radio bearer reconfiguration, normal flow

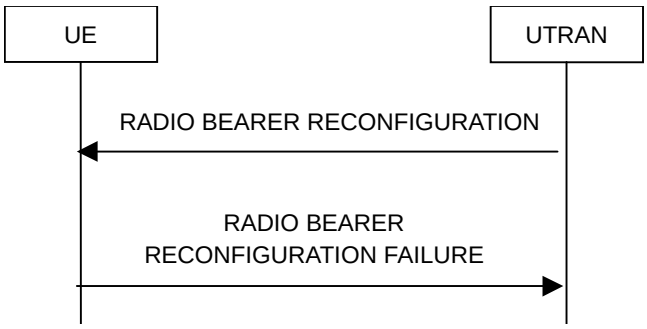

Figure 25: Radio bearer reconfiguration, failure case

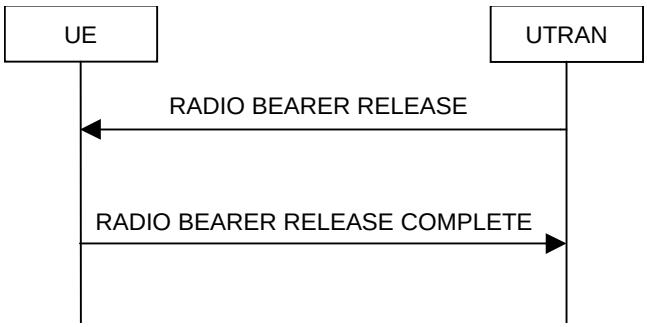

Figure 26: Radio Bearer Release, normal case

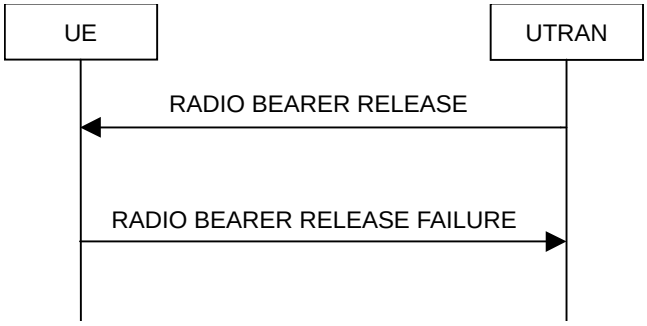

Figure 27: Radio Bearer Release, failure case

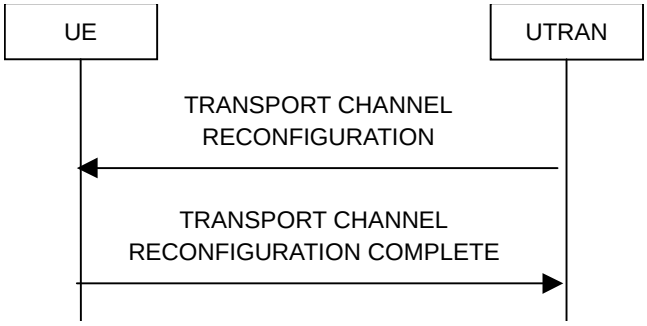

Figure 28: Transport channel reconfiguration, normal flow

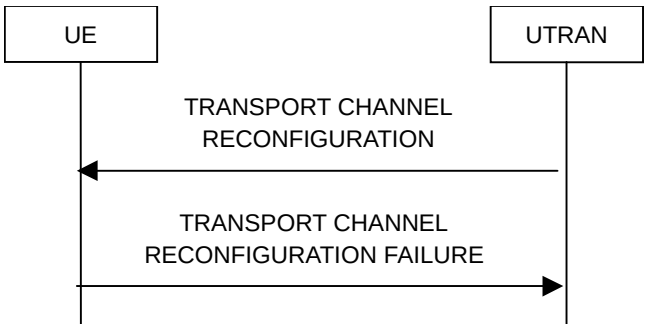

Figure 29: Transport channel reconfiguration, failure case

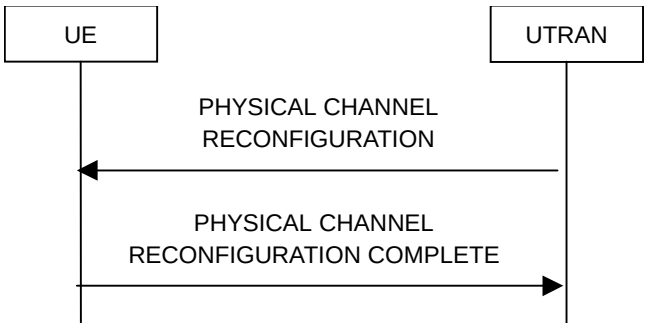

Figure 30: Physical channel reconfiguration, normal flow

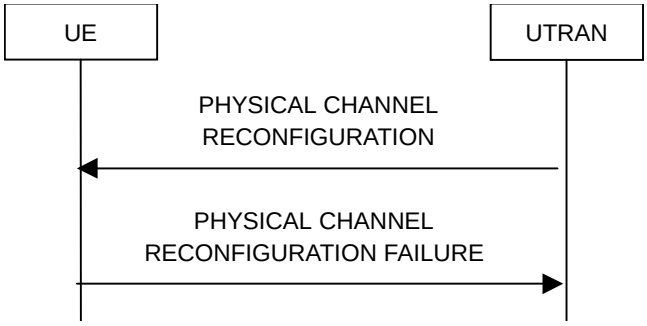

Figure 31: Physical channel reconfiguration, failure case

8.2.2.1 General

Reconfiguration procedures include the following procedures:

- the radio bearer establishment procedure;
- radio bearer reconfiguration procedure;
- the radio bearer release procedure;
- the transport channel reconfiguration procedure; and
- the physical channel reconfiguration procedure.

The radio bearer establishment procedure is used to establish new radio bearer(s).

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer.

The radio bearer release procedure is used to release radio bearer(s).

The transport channel reconfiguration procedure is used to reconfigure transport channel parameters.

The physical channel reconfiguration procedure is used to establish, reconfigure and release physical channels.

While performing any of the above procedures, these procedures may perform a hard handover - see subclause 8.3.5.

8.2.2.2 Initiation

To initiate any one of the reconfiguration procedures, UTRAN should:

- configure new radio links in any new physical channel configuration;
- start transmission and reception on the new radio links;
- for a radio bearer establishment procedure:
  - transmit a RADIO BEARER SETUP message on the downlink DCCH using AM or UM RLC;
- for a radio bearer reconfiguration procedure:
  - transmit a RADIO BEARER RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a radio bearer release procedure:
  - transmit a RADIO BEARER RELEASE message on the downlink DCCH using AM or UM RLC;
- for a transport channel reconfiguration procedure:
  - transmit a TRANSPORT CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;

- for a physical channel reconfiguration procedure:
  - transmit a PHYSICAL CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- if the reconfiguration procedure is simultaneous with SRNS relocation procedure:
  - include the IE "Downlink counter synchronisation info"; and
  - if ciphering and/or integrity protection are activated:
    - include new ciphering and/or integrity protection configuration information to be used after reconfiguration;
  - use the downlink DCCH using AM RLC;
- if transport channels are added, reconfigured or deleted in uplink and/or downlink:
  - set TFCS according to the new transport channel(s).
- if transport channels are added or deleted in uplink and/or downlink, and RB Mapping Info applicable to the new configuration has not been previously provided to the UE, the UTRAN should:
  - send the RB Mapping Info for the new configuration.

In the Radio Bearer Reconfiguration procedure UTRAN may indicate that uplink transmission shall be stopped or continued on certain radio bearers. Uplink transmission on a signalling radio bearer used by the RRC signalling (signalling radio bearer RB1 or signalling radio bearer RB2) should not be stopped.

NOTE 1: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure", even if UTRAN does not require the reconfiguration of any RB. In these cases, UTRAN may include only the IE "RB identity" within the IE "RB information to reconfigure".

NOTE 2: The RADIO BEARER RECONFIGURATION message always includes the IE "Downlink information per radio link list", even if UTRAN does not require the reconfiguration of any RL. In these cases, UTRAN may re-send the currently assigned values for the mandatory IEs included within the IE "Downlink information per radio link list ". Moreover, the RADIO BEARER RECONFIGURATION message always includes the IE "Primary CPICH Info" (FDD) or IE "Primary CCPCH Info" (TDD). This implies that in case UTRAN applies the RADIO BEARER RECONFIGURATION message to move the UE to CELL_FACH state, it has to indicate a cell. However, UTRAN may indicate any cell; the UE anyhow performs cell selection and notifies UTRAN if it selects another cell than indicated by UTRAN.

If the IE "Activation Time" is included, UTRAN should set it to a value taking the UE performance requirements into account.

UTRAN should take the UE capabilities into account when setting the new configuration.

If the message is used to initiate a transition from CELL_DCH to CELL_FACH state, the UTRAN may assign a common channel configuration of a given cell and C-RNTI to be used in that cell to the UE.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or
- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or

- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- perform the physical layer synchronisation procedure as specified in [29];
- act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
  - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
  - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- remove any C-RNTI from MAC;
- clear the variable C_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];

- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - re-establish RB2;
  - set the new uplink and downlink HFN of RB2 to MAX(uplink HFN of RB2 | downlink HFN of RB2) + 1~~increment by one the downlink and uplink HFN values for RB2~~;
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;

- include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";

- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
  - if prior to this procedure there exist no transparent mode RLC radio bearers:
    - if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
    - if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
      - include the IE "COUNT-C activation time" and specify a CFN value ~~other than the default, "Now",~~ for this IE;
  - if prior to this procedure there exists at least one transparent mode RLC radio bearer:
    - if, at the conclusion of this procedure, no transparent mode RLC radio bearers exist:
      - include the IE "COUNT-C activation time" ~~in the response message~~ and specify a CFN value ~~other than the default, "Now",~~ for this IE;
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" according to subclause 8.6.6.26;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;

- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state from CELL_DCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - the procedure ends;
- if the UE enters CELL_PCH state from CELL_FACH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure is successfully completed:
    - the procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:
  - initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
  - when the URA update procedure is successfully completed:
    - the procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the IE "Downlink counter synchronization info" was included in the reconfiguration message:
  - when RLC has confirmed the successful transmission of the response message:
    - re-establish all AM and UM RLC entities with RB identities larger than ~~3~~ 4 and set the first 20 bits of all their HFN values to the START value included in the response message for the corresponding CN domain;
    - re-establish the RLC entities with RB identities ~~1 and 3~~1,3 and 4 and set the first 20 bits of all their HFN values to the START value included in the response message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
    - set the remaining bits of the HFN values of all AM and UM RLC entities with RB identities different from 2 to zero;
- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;
  - if the received reconfiguration message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;

- if the received reconfiguration message contained the IE "Ciphering mode info":

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received reconfiguration message contained the IE "Integrity protection mode info":

  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and

  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- clear the variable PDCP_SN_INFO;

- clear the variable START_VALUE_TO_TRANSMIT.

8.2.2.5 Reception of a response message by the UTRAN, normal case

When UTRAN has received

- the RADIO BEARER SETUP COMPLETE message; or
- the RADIO BEARER RECONFIGURATION COMPLETE message; or
- the RADIO BEARER RELEASE COMPLETE message; or
- the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message; or
- the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message;

UTRAN may:

- delete the old configuration.

If the procedure caused the UE to leave the CELL_FACH state, UTRAN may:

- delete the C-RNTI of the UE.

If the IE "UL Timing Advance" is included in TDD, UTRAN should:

- evaluate the timing advance value that the UE has to use in the new cell after handover.

If the IE "START" or the IE "START list " is included, UTRAN should:

- set the START value for each CN domain with the corresponding values as received in this response message;
- consequently, then use the START values to initialise the hyper frame numbers, in the same way as specified for the UE in subclause 8.2.2.3, for any new radio bearers that are established.

If UTRAN has ordered a ciphering reconfiguration by including the IE “Ciphering mode info” UTRAN should:

For radio bearers using RLC-AM or RLC-UM~~, UTRAN should~~:

- use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
- use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
- if an RLC reset or re-establishment occurs after this response message has been received by UTRAN before the activation time for the new ciphering configuration has been reached:

- ignore the activation time; and
- apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

For radio bearers using RLC-TM:

- use the new ciphering configuration and only begin incrementing the COUNT-C at the CFN as indicated in:
  - the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info", if included in the message that triggered the radio bearer control procedure; or
  - the IE "COUNT-C activation time", if included in the response message for this procedure.

The procedure ends on the UTRAN side.

8.2.2.6 Unsupported configuration in the UE

If the UTRAN instructs the UE to use a configuration, which it does not support and/or if the received message causes the variable UNSUPPORTED_CONFIGURATION to be set to TRUE, the UE shall:

- transmit a failure response as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "configuration unsupported";
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.7 Physical channel failure

A physical channel failure occurs in case the criteria defined in subclause 8.5.4 are not fulfilled.

If the received message caused the UE to be in CELL_DCH state and the UE failed to establish the dedicated physical channel(s) indicated in the received message the UE shall:

- revert to the configuration prior to the reception of the message (old configuration);
- if the old configuration includes dedicated physical channels (CELL_DCH state) and the UE is unable to revert to the old configuration:
  - select a suitable UTRA cell according to [4];
  - initiate a cell update procedure according to subclause 8.3.1, using the cause "radio link failure";
  - after the cell update procedure has completed successfully:
    - proceed as below;
- if the old configuration does not include dedicated physical channels (CELL_FACH state):
  - select a suitable UTRA cell according to [4];
  - if the UE selects another cell than the cell the UE camped on upon reception of the reconfiguration message:
    - initiate a cell update procedure according to subclause 8.3.1, using the cause "Cell reselection";
    - after the cell update procedure has completed successfully:

- proceed as below;

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "physical channel failure";
- set the variable ORDERED_RECONFURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.8 Cell re-selection

If the UE performs cell re-selection during the reconfiguration procedure, the UE shall:

- initiate a cell update procedure, as specified in subclause 8.3.1;
- continue with the reconfiguration procedure.

8.2.2.9 Transmission of a response message by the UE, failure case

The UE shall:

- in case of reception of a RADIO BEARER SETUP message:
  - if the radio bearer establishment procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER SETUP FAILURE message;
  - transmit a RADIO BEARER SETUP FAILURE as response message on the DCCH using AM RLC;
- in case of reception of a RADIO BEARER RECONFIGURATION message:
  - if the radio bearer reconfiguration procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER RECONFIGURATION FAILURE message;
  - transmit a RADIO BEARER RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;
- in case of reception of a RADIO BEARER RELEASE message:
  - if the radio bearer release procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER RELEASE FAILURE message;
  - transmit a RADIO BEARER RELEASE FAILURE as response message on the DCCH using AM RLC;

  in case of reception of a TRANSPORT CHANNEL RECONFIGURATION message:

  - transmit a TRANSPORT CHANNEL RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;

  in case of reception of a PHYSICAL CHANNEL RECONFIGURATION message:

- transmit a PHYSICAL CHANNEL RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;

- when the response message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if no reconfiguration attempt had occurred.

8.2.2.10 Reception of a response message by the UTRAN, failure case

When the UTRAN has received

- the RADIO BEARER SETUP FAILURE message; or
- the RADIO BEARER RECONFIGURATION FAILURE message; or
- the RADIO BEARER RELEASE FAILURE message; or
- the TRANSPORT CHANNEL RECONFIGURATION FAILURE message; or
- the PHYSICAL CHANNEL RECONFIGURATION FAILURE message;

the UTRAN may restore the old and delete the new configuration. Upper layers should be notified of the failure.

The procedure ends on the UTRAN side.

8.2.2.11 Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE the UE shall:

- keep the configuration existing before the reception of the message;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry;
  - set the IE "failure cause" to "invalid configuration";
- set the variable INVALID_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.12 Incompatible simultaneous reconfiguration

If the table "Rejected transactions" in the variable TRANSACTIONS is set due to the received message and the variable PROTOCOL_ERROR_REJECT is set to FALSE, the UE shall:

- not apply the configuration contained in the received reconfiguration message;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Rejected transactions" in the variable TRANSACTIONS; and
  - clear that entry;

- set the IE "failure cause" to "incompatible simultaneous reconfiguration";

- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.12a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION is set to TRUE due to the received reconfiguration message, the UE shall:

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.12b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received reconfiguration message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE;

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "cell update occurred";
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the received reconfiguration message contained the IE "Integrity protection mode info":

- set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
- clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.13 Invalid received message

If the received reconfiguration message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Rejected transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "protocol error";
  - include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.

The procedure ends.

8.3.1.5 Reception of an CELL UPDATE/URA UPDATE message by the UTRAN

When the UTRAN receives a CELL UPDATE/URA UPDATE message, it may either:

- in case the procedure was triggered by reception of a CELL UPDATE:
  - update the START value for each CN domain as maintained in UTRAN (refer to subclause 8.5.9) with "START" in the IE "START list" for the CN domain as indicated by "CN domain identity" in the IE "START list";
  - if this procedure was triggered while the UE was not in CELL_DCH state, then for each CN domain as indicated by "CN domain identity" in the IE "START list":
    - set the 20 MSB of the MAC-d HFN with the corresponding START value in the IE "START list";
    - set the remaining LSB of the MAC-d HFN to zero;
  - transmit a CELL UPDATE CONFIRM message on the downlink DCCH or optionally on the CCCH but only if ciphering is not required; and
  - optionally include the IE "RLC re-establish indicator" to request a RLC re-establishment in the UE, in which case the corresponding RLC entities should also be re-established in UTRAN; or
- in case the procedure was triggered by reception of a URA UPDATE:
  - transmit a URA UPDATE CONFIRM message to the lower layers for transmission on the downlink CCCH or DCCH in which case the UTRAN should include the IE "URA identity" in the URA UPDATE CONFIRM message in a cell where multiple URA identifiers are broadcast; or
- initiate an RRC connection release procedure (see subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH. In particular UTRAN should:
  - if the CELL UPDATE message was sent because of an unrecoverable error in RB2, RB3 or RB4:

- initiate an RRC connection release procedure (subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
    - for radio bearers with RB identity larger than 4:
      - re-establish the AM RLC entities;

- if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
  - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;

- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

- ~~if a~~ for each CN domain for which a transparent mode radio bearer ~~or signalling radio bearer~~ exists and for ~~the corresponding CN domain~~ which the IE "Status" in the variable CIPHERING_STATUS is set to "Started" ~~the UE shall~~ for that CN domain:
  - choose an activation time for the ciphering on transparent mode radio bearers and include it in the response message in the IE "COUNT-C activation time";
  - ~~for each CN domain in which a transparent mode radio bearer or signalling radio bearer exists:~~
    - ~~stop incrementing the COUNT-C value for the DPCH of that CN domain;~~
  - set the 20 MSB of the MAC-d HFN with the corresponding START value in the most recently sent IE "START list";
  - set the remaining LSB of the MAC-d HFN to zero;
  - apply ciphering on ~~that~~ the transparent mode radio bearers;
  - start incrementing the COUNT-C value from the CFN that has been included in the IE "COUNT-C activation time";

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:

- use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a URA update procedure:
    - stop the URA update procedure; and
    - continue with a cell update procedure;
  - set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
  - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;

- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
- and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include ~~and set~~ the IE "~~Integrity~~ Uplink integrity protection activation info" in any response message transmitted below and set this IE to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;

- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.

8.3.3.3 Reception of UTRAN MOBILITY INFORMATION message by the UE

When the UE receives a UTRAN MOBILITY INFORMATION message, it shall:

- act on received information elements as specified in subclause 8.6;
- if the IE "UE Timers and constants in connected mode" is present:
  - store the values of the IE "UE Timers and constants in connected mode" in the variable TIMERS_AND_CONSTANTS, replacing any previously stored value for each timer and constant; and
  - for each updated timer value:
    - start using the new value next time the timer is started;
  - for each updated constant value:
    - start using the new value directly;

- set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION CONFIRM message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the UTRAN MOBILITY INFORMATION CONFIRM message and set it to the value of the variable PDCP_SN_INFO;
- if the received UTRAN MOBILITY INFORMATION message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the UTRAN MOBILITY INFORMATION CONFIRM message;
- transmit a UTRAN MOBILITY INFORMATION CONFIRM message on the uplink DCCH using AM RLC;
- if the IE "Integrity protection mode info" was present in the UTRAN MOBILITY INFORMATION message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted UTRAN MOBILITY INFORMATION CONFIRM message;
- if the variable PDCP_SN_INFO is empty; and
  - if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
  - if the UTRAN MOBILITY INFORMATION message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

The procedure ends.

8.3.4.3 Reception of an ACTIVE SET UPDATE message by the UE

Upon reception of an ACTIVE SET UPDATE message the UE shall act upon all received information elements as specified in 8.6, unless specified otherwise in the following. The UE shall:

- first add the RLs indicated in the IE "Radio Link Addition Information";
- remove the RLs indicated in the IE "Radio Link Removal Information". If the UE active set is full or becomes full, an RL, which is included in the IE "Radio Link Removal Information" for removal, shall be removed before adding RL, which is included in the IE "Radio Link Addition Information" for addition;
- perform the physical layer synchronisation procedure as specified in [29];
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the ACTIVE SET UPDATE COMPLETE message; and
  - set it to the value of the variable PDCP_SN_INFO;
- if the IE "TFCI combining indicator" associated with a radio link to be added is set to TRUE:
  - if a DSCH transport channel is assigned and there is a 'hard' split in the TFCI field:
    - configure Layer 1 to soft-combine TFCI (field 2) of this new link with those links already in the TFCI (field 2) combining set;
- if the received ACTIVE SET UPDATE message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the ACTIVE SET UPDATE COMPLETE message;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE COMPLETE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;
- if the IE "Integrity protection mode info" was present in the ACTIVE SET UPDATE message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted ACTIVE SET UPDATE COMPLETE message;

- if the variable PDCP_SN_INFO is empty:
  - if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
  - if the ACTIVE SET UPDATE message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- the procedure ends on the UE side.

8.3.6.3 Reception of HANDOVER TO UTRAN COMMAND message by the UE

The UE shall be able to receive a HANDOVER TO UTRAN COMMAND message and perform an inter-RAT handover, even if no prior UE measurements have been performed on the target UTRAN cell and/or frequency.

The UE shall act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following. The UE shall:

- store a U-RNTI value (32 bits), which is derived by the IEs "SRNC identity" (12 bits) and "S-RNTI 2" (10 bits) included in IE "U-RNTI-short". In order to produce a full size U-RNTI value, a full size "S-RNTI" (20 bits) shall be derived by padding the IE "S-RNTI 2" with 10 zero bits in the most significant positions; and
- initialise the variable ESTABLISHED_SIGNALLING_CONNECTIONS with the signalling connections that remains after the handover according to the specifications of the source RAT;
- initialise the variable UE_CAPABILITIES_TRANSFERRED with the UE capabilities that have been transferred to the network up to the point prior to the handover, if any;
- initialise the variable TIMERS_AND_CONSTANTS to the default values and start to use those timer and constants values;
- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Predefined configuration":

- initiate the radio bearer and transport channel configuration in accordance with the predefined parameters identified by the IE "Predefined configuration identity";
- initiate the physical channels in accordance with the predefined parameters identified by the IE "Predefined radio configuration identity" and the received physical channel information elements;
- store information about the established radio access bearers and radio bearers according to the IE "Predefined configuration identity"; and
- set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Default configuration":
  - initiate the radio bearer and transport channel configuration in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity";
  - initiate the physical channels in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity" and the received physical channel information elements;

  NOTE IE "Default configuration mode" specifies whether the FDD or TDD version of the default configuration shall be used

  - set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration":
  - use the following values for parameters that are neither signalled within the HANDOVER TO UTRAN COMPLETE message nor included within pre-defined or default configuration:
    - 0 dB for the power offset $P_{Pilot\text{-}DPDCH}$ bearer in FDD;
    - calculate the Default DPCH Offset Value using the following formula:
      - in FDD:

        Default DPCH Offset Value = (SRNTI 2 mod 600) * 512

      - in TDD:

        Default DPCH Offset Value = (SRNTI 2 mod 7)

    - handle the above Default DPCH Offset Value as if an IE with that value was included in the message, as specified in subclause 8.6.6.21;

- if IE "Specification mode" is set to "Complete specification":
  - initiate the radio bearer, transport channel and physical channel configuration in accordance with the received radio bearer, transport channel and physical channel information elements;

- perform an open loop estimation to determine the UL transmission power according to subclause 8.5.3;
- if ciphering has been activated and ongoing in the radio access technology from which inter- RAT handover is performed:
  - for the CN domain as in the IE "CN domain identity" which is included in the IE "RAB info" of the IE "RAB information to setup":
    - set the HFN component of the COUNT-C variable for all UL and DL radio bearers and all UL and DL signalling radio bearers that use RLC-AM and RLC-UM to the START value as stored in the USIM for that CN domain; and
    - set the remaining LSBs of the HFN component of COUNT-C to zero;

- set the HFN component of the COUNT-C variable for all UL and DL radio bearers and all UL and DL signalling radio bearers that use the transparent mode of RLC to zero, while not incrementing the value of the HFN component of the COUNT-C variable at each CFN cycle; and
- set the CFN component of the COUNT-C variable to the value of the CFN as calculated in subclause 8.5.15;
- set the IE "Status" in the variable CIPHERING_STATUS to "Started";
- apply the same ciphering status (ciphered/unciphered~~, algorithm~~) as prior to inter-RAT handover

~~-~~if the~~, unless a~~ change of algorithm is requested by means of the IE "Ciphering algorithm";

-

- apply this algorithm and apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;

~~- apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

~~- if the IE "Ciphering algorithm" is not included then apply the same ciphering algorithm as prior to inter-RAT handover immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

~~- apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

If the UE succeeds in establishing the connection to UTRAN, it shall:

- if the IE "Status" in the variable CIPHERING_STATUS of a CN domain is set to "Started" and transparent mode radio bearers have been established by this procedure for that CN domain:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
  - at the CFN value as indicated in the response message in the IE "COUNT-C activation time":
    - set the HFN component of the COUNT-C variable to the START value as indicated in the IE "START list" of the response message for the relevant CN domain; and
    - set the remaining LSBs of the HFN component of COUNT-C to zero;
    - increment the HFN component of the COUNT-C variable by one;
    - set the CFN component of the COUNT-C to the value of the IE "COUNT-C activation time" of the response message. The HFN component and the CFN component completely initialise the COUNT-C variable;
    - step the COUNT-C variable, as normal, at each CFN value. The HFN component is no longer fixed in value but incremented at each CFN cycle;
- transmit a HANDOVER TO UTRAN COMPLETE message on the uplink DCCH, using the new ciphering configuration, only if ciphering has been started;
- when the HANDOVER TO UTRAN COMPLETE message has been submitted to lower layers for transmission:
  - initialise variables upon entering UTRA RRC connected mode as specified in subclause 13.4;
- and the procedure ends.

8.5.2 Actions when entering idle mode from connected mode

When entering idle mode from connected mode, the UE shall:

- clear or set variables upon leaving UTRA RRC connected mode as specified in subclause 13.4;
- attempt to select a suitable cell to camp on.

When leaving connected mode according to [4], the UE shall:

- perform cell selection.

While camping on a cell, the UE shall:

- acquire system information according to the system information procedure in subclause 8.1;
- perform measurements according to the measurement control procedure specified in subclause 8.4; and
- if the UE is registered:
  - be prepared to receive paging messages according to the paging procedure in subclause 8.2.

If IE "PLMN identity" within variable SELECTED_PLMN has the value "GSM-MAP", the UE shall:

- delete any NAS system information received in connected mode;
- acquire the NAS system information in system information block type 1; and
- proceed according to subclause 8.6.1.2.

When entering idle mode, the UE shall:

- if the USIM is present:
  - store the current START value for every CN domain in the USIM [50];
  - if the "START" stored in the USIM [50] for a CN domain is greater than the value "THRESHOLD" of the variable START_THRESHOLD:
    - delete the ciphering and integrity keys that are stored in the USIM for that CN domain;
    - set the value of START value to THRESHOLD;
    - inform the deletion of these keys to upper layers.

8.5.8 Maintenance of Hyper Frame Numbers

The MSBs of both the ciphering sequence numbers (COUNT-C) and integrity sequence numbers (COUNT-I), for the ciphering and integrity protection algorithms, respectively [40], are called the Hyper Frame Numbers (HFN).

For integrity protection, the UE shall:

- maintain COUNT-I as specified in subclause 8.5.10.

The following hyper frame numbers types are defined:

MAC-d HFN:
24 MSB of COUNT-C for data sent over RLC TM

RLC UM HFN:
25 MSB of COUNT-C for data sent over RLC UM

RLC AM HFN:
20 MSB of COUNT-C for data sent over RLC AM

RRC HFN:
28 MSB of COUNT-I

For non-transparent mode RLC signalling radio bearers and radio bearers, the UE shall:

- maintain one uplink and one downlink COUNT-C per signalling radio bearer and per radio bearer and one uplink and one downlink COUNT-I per signalling radio bearer.

For all transparent mode RLC signalling radio bearers and radio bearers of each CN domain, the UE shall:

- maintain one COUNT-C, common for all signalling radio bearers and radio bearers in uplink and downlink;
- maintain one uplink and one downlink COUNT-I per signalling radio bearer.

NOTE: In this release of the specification there is only an uplink transparent mode COUNT-I, which is used for signalling radio bearer RB0.

COUNT-C and COUNT-I are defined in [40], with the following supplement for COUNT-C: for transparent mode RLC radio bearers with a transmission time interval of x radio frames (x = 2, 4, 8), the MAC PDU is carried by L1 in x consecutive radio frames due to radio frame segmentation. In this case, the CFN of the first segment of the MAC PDU is used as the CFN component of COUNT-C.

8.5.9 START value calculation

~~The START value calculation, or locally stored START value maintained in both the UE and UTRAN is generally performed for CN domain [40]:~~

- ~~whenever a START value is required to initialise the HFN components of COUNT-C and COUNT-I;~~
- ~~whenever the 20 MSB of the COUNT-C and COUNT-I;~~

~~The START value calculation maintains the value equal to the highest currently used HFN + 1 for each CN domain. The START value calculation shall be calculated in UE and UTRAN as specified below:~~

[NOTE: All indentations are increased by one]

In connected mode, the START value for CN domain 'X' is calculated as:

Let $START_X$ = the START value for CN domain 'X' prior to the calculation below:

$START_X'$ = MSB_{20} (MAX {COUNT-C, COUNT-I | radio bearers and signalling radio bearers ~~with~~ using the most recently configured CK_X and IK_X}) + 1.

- if $START_X'$= the maximum value = 1048575 then $START_X$ = $START_X'$;
- if the current $START_X$ < $START_X'$ then $START_X$ = $START_X'$, otherwise $START_X$ is unchanged.

NOTE: Here, “most recently configured” means that if there are more than one key in use for a CN domain, due to non expiry of the ciphering and/or integrity protection activation time for any signalling radio bearers and/or radio bearers, do not include the COUNT-I/COUNT-C for these signalling radio bearers and/or radio bearers in the calculation of the $START_X'$.

8.5.10 Integrity protection

If the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" then the UE ~~and UTRAN~~ shall ~~(and UTRAN should)~~:

- perform integrity protection (and integrity checking) on all RRC messages, with the following exceptions:

  HANDOVER TO UTRAN COMPLETE

  PAGING TYPE 1

  PUSCH CAPACITY REQUEST

  PHYSICAL SHARED CHANNEL ALLOCATION

  RRC CONNECTION REQUEST

  RRC CONNECTION SETUP

  RRC CONNECTION SETUP COMPLETE

  RRC CONNECTION REJECT

  RRC CONNECTION RELEASE (CCCH only)

SYSTEM INFORMATION

SYSTEM INFORMATION CHANGE INDICATION

TRANSPORT FORMAT COMBINATION CONTROL (TM DCCH only)

If the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Not started" then integrity protection (and integrity checking) shall not be performed on any RRC message.

For each signalling radio bearer, the UE shall use two RRC hyper frame numbers:

- "Uplink RRC HFN";
- "Downlink RRC HFN".

and two message sequence numbers:

- "Uplink RRC Message sequence number";
- "Downlink RRC Message sequence number".

The above information is stored in the variable INTEGRITY_PROTECTION_INFO per signalling radio bearer (RB0-RB4).

Upon the first activation of integrity protection for an RRC connection, UE and UTRAN initialise the "Uplink RRC Message sequence number" and "Downlink RRC Message sequence number" for all signalling radio bearers as specified in subclauses 8.6.3.5 and 8.5.10.1.

~~As a general rule, the~~The RRC message sequence number (RRC SN) is incremented for every integrity protected RRC message. ~~In cases when there are exceptions, these are stated for those procedures.~~

8.5.10.1 Integrity protection in downlink

If the UE receives an RRC message on signalling radio bearer with RB identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is present the UE shall:

~~- perform the actions in subclause 8.6.3.5; and~~

~~- apply the new integrity protection configuration;~~

- check the value of the IE "RRC message sequence number" included in the IE "Integrity check info";
  - if the "Downlink RRC Message sequence number" is not present in the variable INTEGRITY_PROTECTION_INFO:
    - initialise the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received message;
  - if the "Downlink RRC Message sequence number" is present in the variable INTEGRITY_PROTECTION_INFO:
    - if the RRC message sequence number is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO:
      - increment "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with one;
    - if the RRC message sequence number is equal to the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO:
      - discard the message;
- calculate an expected message authentication code in accordance with subclause 8.5.10.3;
- compare the expected message authentication code with the value of the received IE "message authentication code" contained in the IE "Integrity check info";

- if the expected message authentication code and the received message authentication code are the same, the integrity check is successful:
  - update the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received RRC message;
- if the calculated expected message authentication code and the received message authentication code differ:
  - if the IE "RRC message sequence number" included in the IE "Integrity check info" is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO (in this case the "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO was incremented by one, as stated above):
    - decrement "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO by one;
  - discard the message.

If the UE receives an RRC message on signalling radio bearer with identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is not present the UE shall:

- discard the message.

8.5.10.2 Integrity protection in uplink

~~Upon transmitting an~~ Prior to sending an RRC message using the signalling radio bearer with radio bearer identity n, and the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" the UE shall:

- increment "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with 1. When "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO becomes 0, the UE shall increment "Uplink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with 1;
- calculate the message authentication code in accordance with subclause 8.5.10.3;
- replace the "Message authentication code" in the IE "Integrity check info" in the message with the calculated message authentication code~~.~~;
- replace the "RRC Message sequence number" in the IE "Integrity check info" in the message with contents set to the new value of the "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO;

~~During an ongoing reconfiguration of the integrity protection, UTRAN should, for all signalling radio bearers, apply the old configuration (that is, the configuration that was applied before the reconfiguration) for the integrity protection.~~ In the response message for the procedure ordering the security reconfiguration, the UE indicates the activation time, for each signalling radio bearer except ~~RB2~~for the signalling radio bearer that was used for this security reconfiguration procedure~~, w~~. When the new integrity configuration is to be applied in uplink~~.~~, UTRAN should then start to apply the new integrity protection configuration according to the activation time for each signalling radio bearer (except for the signalling radio bearer ~~RB2~~ which is used to send the message that is reconfiguring the security configuration) where the new configuration is to be applied starting from and including reception of the response message~~)~~.

8.5.10.3 Calculation of message authentication code

The UE shall calculate the message authentication code in accordance with [40]. The input parameter MESSAGE [40] for the integrity algorithm shall be constructed by:

- setting the "Message authentication code" in the IE "Integrity check info" in the message to the radio bearer identity for the signalling radio bearer;
- setting the "RRC Message sequence number" in the IE "Integrity check info" in the message to zero;
- encoding the message;
- appending RRC padding (if any) as a bit string to the encoded bit string as the least significant bits.

For usage on an RRC message transmitted or received on the radio bearer with identity n, the UE shall:

- construct the input parameter COUNT-I [40] by appending the following IEs from the IE "Signalling radio bearer specific integrity protection information" for radio bearer n in the variable INTEGRITY_PROTECTION_INFO:
  - for uplink:
    - "Uplink RRC HFN", as the MSB, and "Uplink RRC Message sequence number", as LSB;
  - for downlink:
    - "Downlink RRC HFN", as the MSB, and the IE "RRC message sequence number" included in the IE "Integrity check info", as LSB.

8.6.3.4 Ciphering mode info

The IE "Ciphering mode info" defines the new ciphering configuration. At any given time, the UE needs to store at most two different ciphering configurations at any given time for all signalling radio bearers and radio bearers, the old and latest ciphering configurations, per CN domain.

[NOTE: Created a paragraph here. Also the indentation has changed in SOME places]

~~If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration and therefore shall not follow any of the actions as specified (in this subclause) below.~~

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration"~~for any CN domain~~ in the variable CIPHERING_STATUS~~,~~ ~~the IE "Reconfiguration" in the variable CIPHERING_STATUS~~is set to TRUE, the UE shall:

- ignore this second attempt to change the ciphering configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall:~~If for all CN domains in the variable CIPHERING_STATUS, the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall~~: ~~check the IE "Ciphering mode command" as part of the IE "Ciphering mode info", and perform the following. The UE shall:~~

- ~~if the IE "Status" in the variable CIPHERING_STATUS of the CN domain~~
  - ~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~
  - ~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~

  ~~has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop":~~
  - ~~ignore this attempt to change the ciphering configuration; and~~
  - ~~set the variable INVALID_CONFIGURATION to TRUE;~~
- if the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop"; or
- if the IE "Status" in the variable “CIPHERING STATUS has the value "Not started", and this IE was included in a message that is not the message SECURITY MODE COMMAND~~:~~; or
- if there does not exist exactly one ciphering activation time in the IE “Radio bearer downlink ciphering activation time info” for each established RLC-AM and RLC-UM radio bearers included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN; or

- if there does not exist exactly one ciphering activation time in the IE “Ciphering activation time for DPCH” for each established RLC-TM radio bearers included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN; or

- if there does not exist exactly one ciphering activation time in the IE “Radio bearer downlink ciphering activation time info” for each established signalling radio bearer included in the IE “Signalling radio bearer information” in the IE “ESTABLISHED_RABS” ~~for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~

~~if this procedure changes the ciphering configuration for RBs of a CN domain for which the IE "Status" in the variable CIPHERING_STATUS is "Not Started":~~

- ignore this attempt to change the ciphering configuration;

- set the variable INVALID_CONFIGURATION to TRUE;

- perform the actions as specified in subclause 8.1.12.4c;

~~exit this subclause and go to the subclause on handling of invalid configurations for this procedure;~~

~~else:~~

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall: ~~If for all CN domains in the variable CIPHERING_STATUS, the IE "Reconfiguration" is set to FALSE, then for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, the UE shall:~~

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to TRUE;
- if IE "Ciphering mode command" has the value "start/restart":

~~start or restart ciphering in lower layers for all established radio bearers in the variable ESTABLISHED_RABS, using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration. For each radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER in the ciphering algorithm. The new ciphering configuration shall be applied as specified below;~~

- set the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain

~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~as indicated in the IE "CN domain identity" in the message, if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~

~~-~~ to "Started";

- start or restart the new ciphering configuration in the lower layers:

- ~~if for all established radio bearers that are included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the:~~

~~variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~in the IE "CN domain identity" of the message, if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised;~~

~~there exists an associated ciphering activation time for exactly each radio bearer above in the IE “Radio bearer downlink ciphering activation time info”;~~

~~else;~~

~~set the variable INVALID_CONFIGURATION to TRUE;~~

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

- exit this subclause and go to the subclause on handling of invalid configurations for this procedure;

NOTE: The IE "Ciphering mode info" shall indicate ciphering activation times for exactly all established radio bearers for the relevant CN domain on which the security reconfiguration is being performed.

- if for all signalling radio bearers that are included in the IE "Signalling radio bearer information " in the IE "ESTABLISHED_RABS" there exists an associated ciphering activation time for exactly each signalling radio bearer above in the IE "Radio bearer downlink ciphering activation time info";

- else:

- set the variable INVALID_CONFIGURATION to TRUE;

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

- exit this subclause and go to the subclause on handling of invalid configurations for this procedure;

NOTE: The IE "Ciphering mode info" shall indicate ciphering activation times for exactly all established signalling radio bearers.

- using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration;

- for each radio bearer and signalling radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER [40] in the ciphering algorithm;

- start incrementing the COUNT-C values for all RLC-AM and RLC-UM signalling radio bearers or and continue incrementing the COUNT-C values for all RLC-AM and RLC-UM radio bearers and all RLC-AM and RLC-UM signalling radio bearers;

- if at least one transparent mode radio bearer already exists prior to this procedure and at least one transparent mode radio bearer will exist after this procedure for a this CN domain; and d

- ciphering was started for the this CN domain prior to this procedure; and

- the UE was prior to this procedure in CELL_DCH and will be in CELL_DCH after this procedure;

- continue incrementing the COUNT-C value for that this CN domain;

- else:

- if the UE was in CELL_FACH before this procedure and will be in CELL_DCH after this procedure, and there will be a transparent mode radio bearer or signalling radio bearer [EU51]after the completion of this procedure for a this CN domain:; or

- if the UE was in CELL_DCH before this procedure and will be in CELL_DCH after this procedure and there was no transparent mode radio bearer or signalling radio bearer [EU52]for a this CN domain and there will be a transparent mode radio bearer or signalling radio bearer for that this CN domain after the completion of this procedure and the IE "Ciphering activation time for DPCH" was included in this IE , the UE shall:

- start incrementing the COUNT-C values for that CN domain at the ciphering activation time as specified in the procedure:;

NOTE: If the ciphering activation time for transparent mode radio bearers was specified in the downlink then the IE "Ciphering activation time for DPCH" is included (eg for the SECURITY MODE COMMAND), otherwise, this ciphering activation time is specified in the IE "COUNT-C activation time" in the uplink response message.

- if the IE "Ciphering mode command" has the value "stop", the UE shall:

- when the new ciphering configuration is applied at the time as specified below;
  - stop ciphering for all radio bearers for this CN domain and all signalling radio bearers;
  - stop incrementing COUNT-C values for all UL and DL signalling radio bearers and also for UL and DL radio bearers using RLC-TM;
  - continue incrementing COUNT-C values for all UL and DL radio bearers using RLC-UM or RLC-AM.
  - ~~stop incrementing COUNT-C values for all UL and DL radio bearers and also for UL and DL signalling radio bearers using RLC-TM;~~
  - ~~continue incrementing COUNT-C values for all UL and DL radio bearers and for all UL and DL signalling radio bearers using RLC-UM or RLC-AM;~~
  - ~~stop ciphering and stop incrementing COUNT-C values for all UL and DL signalling radio bearers and also for UL and DL transparent RLC mode radio bearers, only at the new ciphering configuration that shall be applied as specified below;~~
- set the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN to “Not started”;
  - ~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~
  - ~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~
  - ~~to "Not started";~~

- in case the IE "Ciphering mode command" has the value "start/restart" or "stop", the new ciphering configuration shall be applied as follows:
  - store the (oldest currently used) ciphering configuration until activation times have elapsed for the new ciphering configuration to be applied on all signalling radio bearers and radio bearers;
  - if there are pending activation times set for ciphering by a previous procedure changing the ciphering configuration:
    - apply the ciphering configuration at this pending activation time ~~as indicated in this procedure~~;
  - if the IE "Ciphering activation time for DPCH" is present in the IE "Ciphering mode info" and the UE was in CELL_DCH state prior to this procedure:
    - for radio bearers using RLC-TM:
      - apply the old ciphering configuration for CFN less than the number indicated in the IE "Ciphering activation time for DPCH";
      - apply the new ciphering configuration for CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH";
      - ~~apply the new configuration at that time for radio bearers using RLC-TM. If the IE "Ciphering mode info" is present in a message reconfiguring RB, transport channel or physical channel, the indicated time in IE "Activation time for DPCH" corresponds to a CFN after that reconfiguration;~~
  - if the UE was in CELL_FACH state prior to this procedure and at completion of this procedure a transparent mode radio bearer exists and the IE "Ciphering activation time for DPCH" is not present in the IE "Ciphering mode info":
    - for radio bearers using RLC-TM:
      - apply the old ciphering configuration for CFN less than the number as indicated in the transmitted uplink response message for the ciphering activation time for this radio bearer;

    ~~NOTE: This shall be indicated by the IE “COUNT-C activation time” in the transmitted uplink response message.~~

- apply the new ciphering configuration for CFN greater than or equal to the number as indicated in the transmitted uplink response message for the ciphering activation time for this radio bearer;

NOTE: This ~~shall be~~ is indicated by the IE "COUNT-C activation time" in the transmitted uplink response message.

- if the IE "Radio bearer downlink ciphering activation time info" is present~~: in the IE "Ciphering mode info":~~
  - apply the following procedure for each radio bearer and signalling radio bearers using RLC-AM ~~and~~ or RLC-UM indicated by the IE "RB identity":
    - suspend ~~data~~ uplink transmission on the radio bearer ~~and or~~or the signalling radio bearer (except for that SRBm that the message was used)~~s~~;
    - select an "RLC send sequence number" at which (activation) time the new ciphering configuration shall be applied in uplink for that radio bearer according to the following:
      - for each radio bearer ~~and~~ and signalling radio bearer that has no pending ciphering activation time as set by a previous procedure changing the security configuration:
        - set a suitable value that would ensure a minimised delay in the change to the latest security configuration;
      - for each radio bearer ~~and~~ and signalling radio bearer that has a pending ciphering activation time as set by a previous procedure changing the security configuration:
        - set the same value as the pending ciphering activation time;
      - consider this activation time to be elapsed when the selected activation time (as above) is equal to the "RLC send sequence number";
    - store the selected "RLC send sequence number" for that radio bearer in the entry for the radio bearer in the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
    - when the data transmission of that radio bearer or signalling radio bearer is resumed switch to the new ciphering configuration according to the following:

      ~~- switch to the new ciphering configuration according to the following:~~

      - use the old ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers smaller than the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;
      - use the new ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers greater than or equal to the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;
      - for a radio bearer using RLC-AM, when the RLC sequence number indicated in the IE "Radio bearer downlink ciphering activation time info" falls below the RLC receiving window and the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" falls below the RLC transmission window, the UE may release the old ciphering configuration for that radio bearer;
      - if an RLC reset or re-establishment occurs before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

~~If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE, the UE shall:~~

~~- ignore this second attempt to change the ciphering configuration; and~~

~~- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.~~

If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration.

8.6.3.5 Integrity protection mode info

The IE "Integrity protection mode info" defines the new integrity protection configuration. At any given time, the UE needs to store at most two different integrity protection configurations for all signalling radio bearers, the old and newest integrity protection configurations, per CN domain.

[NOTE: Created paragraph]

~~If the IE "Integrity protection mode info" is not present, t~~~~The UE shall not change the integrity protection configuration and therefore shall not follow any of the actions as specified (in this subclause) below.~~

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE, the UE shall:

- ignore this second attempt to change the integrity protection configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_~~STATUS~~ INFO is set to FALSE, the UE shall: ~~check the IE "Integrity protection mode command" as part of the IE "Integrity protection mode info", and perform the following. The UE shall:~~

~~if the IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started":~~

~~ignore this attempt to change the integrity protection configuration; and~~

~~set the variable INVALID_CONFIGURATION to TRUE;~~

~~else:~~

Note: Indentation changed to throughout this section. Not all indentations have changed.

- set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_~~STATUS~~ INFO to TRUE;
- if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and this IE was included in the message SECURITY MODE COMMAND:

~~if the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO has the value "Never been active":~~

- initialise the information for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO according to the following:

~~initialise the 20 MSB of the "Uplink RRC HFN" and "Downlink RRC HFN" of COUNT-I for this signalling radio bearer with the START value included in the most recently transmitted IE "START list" for the CN domain:~~

~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN has not been initialised;~~

~~set the remaining LSB of the "Uplink RRC HFN" and "Downlink RRC HFN" to zero;~~

- set the IE "Uplink RRC Message sequence number" in the ~~IE "~~variable INTEGRITY_PROTECTION_INFO~~"~~ to zero;
- do not include the IE "Downlink RRC Message sequence number" which is included in the ~~IE "~~variable INTEGRITY_PROTECTION_INFO~~"~~;

~~- set the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO to the value "Has been active";~~

- set the IE "Status" in the variable INTEGRITY_PROTECTION_INFO to the value "Started";
- perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
  - ~~use~~ using the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
  - ~~use~~ using the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];

- if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started" and this IE was not included SECURITY MODE COMMAND:

NOTE: This case is used in SRNS relocation

- perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
  - ~~use~~ using the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
  - ~~use~~ using the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];

- if IE "Integrity protection mode command" has the value "modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started" and this IE was included SECURITY MODE COMMAND:
  - store the (~~most recent of the~~ oldest currently used) integrity protection configuration until activation times have elapsed for the new integrity protection configuration to be applied on all signalling radio bearers;
  - if there are pending activation times set for integrity protection by a previous procedure changing the integrity protection configuration:
    - apply the integrity protection configuration at this pending activation time as indicated in this procedure;
  - start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each signalling radio bearer n, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info", included in the IE "Integrity protection mode info";
  - perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
    - if present, use the algorithm indicated by the IE "Integrity protection algorithm" (UIA [40]);

- let RBm be the signalling radio bearer on which the message containing the IE "integrity protection mode info" was received;

  - set the content of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO according to the following:
    - for each established signalling radio bearer, stored in the variable ESTABLISHED_RABS:
      - select a value of the RRC sequence number at which (activation) time the new integrity protection configuration shall be applied in uplink for that signalling radio bearer according to the following:
        - for each signalling radio bearer that has no pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration:

- set a suitable value that would ensure a minimised delay in the change to the latest integrity protection configuration;

- for signalling radio bearer that has a pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration:

  - set the same value as the pending activation time for integrity protection;

- consider this (pending) activation time to be elapsed when the selected activation time (as above) is equal to the next RRC sequence number to be used, which means that the last RRC message using the old integrity protection configuration has been submitted to lower layers;

- for signalling radio bearer RB0:

  - set the value of the included RRC sequence number to greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one;

- prohibit the transmission of RRC messages on all signalling radio bearers, except for RBm, with RRC SN greater than or equal to the value in the "RRC message sequence number list" for the signalling radio bearer in the IE "Uplink integrity protection activation info" of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

~~- let RBm be the signalling radio bearer on which the message containing the IE "integrity protection mode info" was received;~~

- start applying the new integrity protection configuration in the uplink at the RRC sequence number, for each RBn, except for signalling radio bearer RBm, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Uplink integrity protection activation info", included in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- start applying the new integrity protection configuration in the uplink at the RRC sequence number for signalling radio bearer RBm, as specified for the procedure initiating the integrity protection reconfiguration;

- start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each RBn, except for signalling radio bearer RBm, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info".

NOTE: For signalling radio bearers that have a pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration, UTRAN should set this value in IE "Downlink integrity protection activation info".

- start applying the new integrity protection configuration in the downlink at the RRC sequence number for signalling radio bearer RBm, as specified for the procedure initiating the integrity protection reconfiguration;

If IE "Integrity protection mode command" has the value "Start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and the IE "Integrity protection mode command info" was not included in the message SECURITY MODE COMMAND; or

If IE "Integrity protection mode command" has the value "Start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and the IE "Integrity protection mode ~~command~~info" was included in the message SECURITY MODE COMMAND, and the IE “Integrity protection algorithm” is not included; or

If the IE "Integrity protection mode ~~command~~command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started"; or

If there does not exist exactly one integrity protection activation time in the IE “Downlink integrity protection activation info” for each established signalling radio bearer included in the IE “Signalling radio bearer information” in the IE “ESTABLISHED_RABS” ~~for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN~~; or

If IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started", and the IE "Integrity protection mode ~~command~~info" was not included in the message SECURITY MODE COMMAND:

- ignore this attempt to change the integrity protection configuration; and
- set the variable INVALID_CONFIGURATION to TRUE;

~~If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to TRUE, the UE shall:~~

- ~~ignore this second attempt to change the integrity protection configuration; and~~
- ~~set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.~~

If the IE "Integrity protection mode info" is not present, the UE shall not change the integrity protection configuration.

8.6.4.1 Signalling RB information to setup list

If the IE "Signalling RB information to setup list" is included the UE shall:

- use the same START value to initialise the COUNT-C and COUNT-I variables for all the signalling radio bearers in the list;
- for each occurrence of the IE "Signalling RB information to setup":
  - use the value of the IE "RB identity" as the identity of the signalling radio bearer to setup;
  - if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised and the value "STATUS" of the variable "CIPHERING_STATUS" of the CN domain stored in this variable is "Started":
    - if the IE "Uplink RLC mode" or the IE "Downlink RLC mode" in the IE "RLC info" is set to "AM RLC" or "UM RLC":
      - initialise the 20 MSB of the hyper frame number component of COUNT-C for this signalling radio bearer with the START value for the CN domain as indicated in the variable "LATEST_CONFIGURED_CN_DOMAIN";
      - set the remaining LSB of the hyper frame number component of COUNT-C for this signalling radio bearer to zero;

    ~~if the IE "Uplink RLC mode" and/or the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":~~

    - ~~if no other transparent mode RLC radio bearers or signalling radio bearers in the variable "ESTABLISHED_RABS" exist:~~
      - ~~initialise the 20 MSB of the hyper frame number component of COUNT-C for this signalling radio bearer with the START value for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~
      - ~~set the remaining LSB of the hyper frame number component of COUNT-C for this signalling radio bearer to zero;~~
    - ~~if at least one transparent mode RLC radio bearers or signalling radio bearers in the variable "ESTABLISHED_RABS" exist:~~
      - ~~use, for this signalling radio bearer, the COUNT-C for transparent mode radio bearers and signalling radio bearers that is common (refer to subclause 8.5.8), for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~

  - if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised and the value "Status" of the variable "INTEGRITY_PROTECTION_INFO" of the CN domain stored in this variable is "Started":

- initialise the 20 MSB of the hyper frame number component of COUNT-I for this signalling radio bearer with the START value for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;

- set the remaining LSB of the hyper frame number component of COUNT-I for this signalling radio bearer to zero;

- for this signalling radio bearer, set the IE "Uplink RRC Message sequence number" in the variable INTEGRITY_PROTECTION_INFO to zero;

- perform the actions for the IE "RLC info" as specified in subclause 8.6.4.9, applied for that signalling radio bearer;

- perform the actions for the IE "RB mapping info" as specified in subclause 8.6.4.8, applied for that signalling radio bearer;

- apply a default value of the IE "RB identity" equal to 1 for the first IE "Signalling RB information to setup"; and

- increase the default value by 1 for each occurrence.

8.6.4.2 RAB information for setup

If the IE "RAB information for setup" is included, the procedure is used to establish radio bearers belonging to a radio access bearer, and the UE shall:

- if several IEs "RAB information for setup" are included and the included IEs "CN domain identity" in the IE "RAB info" does not all have the same value:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if the radio access bearer identified with the IE "RAB info" does not exist in the variable ESTABLISHED_RABS:

  - create a new entry for the radio access bearer in the variable ESTABLISHED_RABS;

  - store the content of the IE "RAB info" in the entry for the radio access bearer in the variable ESTABLISHED_RABS;

  - indicate the establishment of the radio access bearer to the upper layer entity using the IE "CN domain identity", forwarding the content of the IE "RAB identity";

  If prior to this procedure there exists no transparent mode radio bearer for the CN domain included in the IE "CN domain identity" and at least one transparent mode radio bearer is included in the the IE "RB information to setup"; or

  If at least one RLC-AM or RLC-UM radio bearer is included in the the IE "RB information to setup":

  - calculate the START value only once during this procedure (the same START value shall be used on all new radio bearers created for this radio access bearer) according to subclause 8.5.9 for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information to setup";

  - store the calculated START value in the variable START_VALUE_TO_TRANSMIT;

- for each radio bearer in the IE "RB information to setup":

  - if the radio bearer identified with the IE "RB identity" does not exist in the variable ESTABLISHED_RABS for another radio access bearer than the one identified with the IE "RAB info":

    - perform the actions specified in subclause 8.6.4.3;

    - store information about the new radio bearer in the entry for the radio access bearer identified by "RAB info" in the variable ESTABLISHED_RABS;

  - if the radio bearer identified with the IE "RB identity" does not exist in the variable ESTABLISHED_RABS for the radio access bearer identified with the IE "RAB info":

- create a new RAB subflow for the radio access bearer;
- number the RAB subflow in ascending order, assigning the smallest number to the RAB subflow corresponding to the first radio bearer in the list;
- if the IE "CN domain identity" in the IE "RAB info" is set to "PS domain" and the number of RAB subflows for the radio access bearer is greater than 1:
  - set the variable INVALID_CONFIGURATION to TRUE;

- if the radio bearer identified with the IE "RB identity" already exists in the variable ESTABLISHED_RABS for another radio access bearer than the one identified with the IE "RAB info":
  - set the variable INVALID_CONFIGURATION to TRUE.

8.6.4.2a RAB information to reconfigure

If the IE "RAB information to reconfigure" is included then the UE shall:

- if the entry for the radio access bearer identified by the IE "CN domain identity" together with the IE "RAB Identity" in the variable ESTABLISHED_RABS already exists:
  - perform the action for the IE "NAS Synchronization Indicator", according to subclause 8.6.4.12;
- else:
  - set the variable INVALID_CONFIGURATION to TRUE.

8.6.4.3 RB information to setup

If the IE "RB information to setup" is included, the UE shall apply the following actions on the radio bearer identified with the value of the IE "RB identity". The UE shall:

- use the same START value to initialise the hyper frame number components of COUNT-C ~~and COUNT-I~~ variables for all the new ~~UL and DL~~ UL and DL radio bearers to setup;
- perform the actions for the IE "PDCP info", if present, according to subclause 8.6.4.10, applied for the radio bearer;
- perform the actions for the IE "RLC info", according to subclause 8.6.4.9, applied for the radio bearer;
- perform the actions for the IE "RB mapping info", according to subclause 8.6.4.8, applied for the radio bearer;
- if the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":
  - configure delivery of erroneous SDUs in lower layers according to indication from upper layer [5].
- if the IE "Uplink RLC mode" or the IE "Downlink RLC mode" in the IE "RLC info" is set to "AM RLC" or "UM RLC":
  - initialise the 20 MSB of the hyper frame number component of COUNT-C for this radio bearer with the START value in the variable START_VALUE_TO_TRANSMIT ~~for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup"~~;
  - set the remaining LSB of the hyper frame number component of COUNT-C for this radio bearer to zero;

  - start incrementing the COUNT-C values;
- if the IE "Uplink RLC mode" and the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":
  - if no other transparent mode RLC radio bearers and signalling radio bearers exist in the variable ESTABLISHED_RABS:
    - initialise the 20 MSB of the hyper frame number component of COUNT-C for this radio bearer with the START value ~~for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup~~in the variable START_VALUE_TO_TRANSMIT~~"~~;

- set the remaining LSB of the hyper frame number component of COUNT-C for this radio bearer to zero;

- if at least one transparent mode RLC radio bearers or signalling radio bearers exist in the variable ESTABLISHED_RABS:

  - set the MAC-d HFN component of the COUNT-C for this radio bearer with the MAC-d HFN that is common (refer to subclause 8.5.8) for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup";

- if the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":

  - start to perform ciphering on the radio bearer in lower layers, using the value of the IE "RB identity" minus one as the value of BEARER in the ciphering algorithm.

NOTE: UTRAN should not use the IE "RB information to setup" to setup radio bearers with RB identity in the range 1-4.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall:

- for each multiplexing option of the RB:

  - if a transport channel that would not exist as a result of the message (i.e. removed in the same message in IE "Deleted DL TrCH information" and IE "Deleted UL TrCH information") is referred to:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH is included:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if the multiplexing option realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, the logical channel corresponding to it is mapped onto the same transport channel as another logical channel:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if the transport channel considered in that multiplexing option is different from RACH and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if that RB is using UM or TM and the multiplexing option realises it using two logical channels:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - for each logical channel in that multiplexing option:

    - if the value of the IE "RLC size list" is set to "Explicit list":

      - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or

- if the transport channel this logical channel is mapped on in this multiplexing option is different from RACH, and if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the stored transport format set of that transport channel; or
- if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
- if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
  - set the variable INVALID_CONFIGURATION to TRUE;

- if the value of the IE "RLC size list" is set to "All":
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
    - set the variable INVALID_CONFIGURATION to TRUE;

- if the value of the IE "RLC size list" is set to "Configured":
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and for none of the RLC sizes defined for that transport channel in the "Transport format set", the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel; or
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and for none of the RLC sizes defined in the transport format set stored for that transport channel, the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel:
    - set the variable INVALID_CONFIGURATION to TRUE;

- if, as a result of the message this IE is included in, several radio bearers can be mapped onto the same transport channel, and the IE "Logical Channel Identity" was not included in the RB mapping info of any of those radio bearers for a multiplexing option on that transport channel or the same "Logical Channel Identity" was used more than once in the RB mapping info of those radio bearers for the multiplexing options on that transport channel:
  - set the variable INVALID_CONFIGURATION to TRUE;
- delete all previously stored multiplexing options for that radio bearer;
- store each new multiplexing option for that radio bearer;
- select and configure the multiplexing options applicable for the transport channels to be used;
- if the IE "Uplink transport channel type" is set to the value "RACH":
  - refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in SIB5 or SIB6;
- determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IEs "RLC size list" and/or the IEs "Logical Channel List" included in the applicable "Transport format set" (either the ones received in the same message or the ones stored if none were received); and
- in case the selected multiplexing option is a multiplexing option on RACH:

- ignore the RLC size indexes that do not correspond to any RLC size within the Transport Format Set stored for RACH;

- if RACH is the transport channel to be used on the uplink, if that RB has a multiplexing option on RACH and if it is using AM:
  - apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity;
- if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
  - re-establish the corresponding RLC entity;
  - configure the corresponding RLC entity with the new RLC size;

  for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS for all radio bearers; and

  for the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN for all signalling radio bearers:

  - if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
    - if this IE was included in system information:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~ that will be included in the CELL UPDATE message that will be sent before the next transmission;
    - if this IE was included in CELL UPDATE CONFIRM:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
    - if this IE was included in a reconfiguration message:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if that RB is using UM:
  - indicate the largest applicable RLC size to the corresponding RLC entity;
- configure MAC multiplexing according to the selected multiplexing option (MAC multiplexing shall only be configured for a logical channel if the transport channel it is mapped on according to the selected multiplexing option is the same as the transport channel another logical channel is mapped on according to the multiplexing option selected for it);
- configure the MAC with the logical channel priorities according to selected multiplexing option;
- configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;
- if there is no multiplexing option applicable for the transport channels to be used:
  - set the variable INVALID_CONFIGURATION to TRUE;
- if there is more than one multiplexing option applicable for the transport channels to be used:
  - set the variable INVALID_CONFIGURATION to TRUE.

In case IE "RB mapping info" includes IE "Downlink RLC logical channel info" but IE "Number of downlink RLC logical channels" is absent, the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards

the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	DL channel type implied by "same as"
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

8.6.5.1 Transport Format Set

If the IE "Transport format set" is included, the UE shall:

- if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has the value "Explicit List":
  - ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL':
  - ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL':
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message); or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "Configured" while it is set to "All" or given as an "Explicit List" for any other RLC size; or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "All" and for any logical channel mapped to this transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is given as an "Explicit List" that contains a logical channel for which the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- if the "Logical Channel List" for all the RLC sizes defined for that transport channel are given as "Explicit List" and if one of the logical channels mapped onto this transport channel is not included in any of those lists; or
- if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is also set to "Configured"; or
- if the IE "Transport Format Set" was not received within the IE "PRACH system information list" and if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is given as an "Explicit List" that includes an "RLC size index" that does not correspond to any RLC size in this "Transport Format Set":
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the total number of configured transport formats for the transport channel exceeds maxTF:
  - keep the transport format set if this exists for that transport channel;

- set the variable INVALID_CONFIGURATION to TRUE;

- if the IE "Transport format set" is considered as valid according to the rules above:
  - remove a previously stored transport format set if this exists for that transport channel;
  - store the transport format set for that transport channel;
  - consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* to correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following

      TB size = RLC size + MAC header size,

      where:

      - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits;
      - 'RLC size' reflects the RLC PDU size.
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following:

      TB size = RLC size
  - if the IE "Number of Transport blocks" <> 0 and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;
  - if the IE "Number of Transport blocks" = 0, neither RLC PDU neither data nor parity bits exist for that transport format;
  - configure the MAC with the new transport format set (with computed transport block sizes) for that transport channel;
  - if the RB multiplexing option for a RB mapped onto that transport channel (based on the stored RB multiplexing option) is not modified by this message:
    - determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IE "Logical Channel List" and/or the IE "RLC Size List" from the previously stored RB multiplexing option;
    - if the IE "Transport Format Set" was received within the IE "PRACH system information list":
      - ignore the RLC size indexes in the stored RB multiplexing option that do not correspond to any RLC size in the received Transport Format Set.
    - if the IE "Transport Format Set" was received within the IE "PRACH system information list", if that RB is using AM and if RACH is the transport channel to be used on the uplink:
      - apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity;
    - if the IE "Transport Format Set" was not received within the IE "PRACH system information list", and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
      - set the variable INVALID_CONFIGURATION to true;
    - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
      - re-establish the corresponding RLC entity;
      - configure the corresponding RLC entity with the new RLC size;

for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS for all radio bearers; and

for the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN for all signalling radio bearers:

- if this IE was included in system information and if the IE "Status" in variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~ that will be included in the CELL UPDATE message that will be sent before the next transmission;
- if this IE was included in CELL UPDATE CONFIRM and if the IE "Status" in the variable CIPHERING_STATUS of this ~~the~~ CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if this IE was included in a reconfiguration message and if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if this IE was included in ACTIVE SET UPDATE and if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the ACTIVE SET UPDATE COMPLETE message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;

- if that RB is using UM:
  - indicate the largest applicable RLC size to the corresponding RLC entity;
- configure MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB.

For configuration restrictions on Blind Transport Format Detection, see [27].

10.2.9 COUNTER CHECK

This message is used by the UTRAN to indicate the current COUNT-C MSB values associated to each radio bearer utilising UM or AM RLC mode and to request the UE to compare these to its COUNT-C MSB values and to report the comparison results to UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C MSB information	MP	1 to < maxRBallRABs >		For each RB (excluding signalling radio bearers) using UM or AM RLC.
>RB COUNT-C MSB information	MP		RB COUNT-C MSB information 10.3.4.14	

10.2.10 COUNTER CHECK RESPONSE

This message is used by the UE to respond to a COUNTER CHECK message.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C information	OP	1 to < maxRBallRABs >		
>RB COUNT-C information	MP		RB COUNT-C information 10.3.4.15	

10.2.34 RADIO BEARER SETUP COMPLETE

This message is sent by UE to confirm the establishment of the radio bearer.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Uplink integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	
CHOICE *mode*	OP			
>FDD				(no data)
>TDD				
>>Uplink Timing Advance	OP		Uplink Timing Advance 10.3.6.95	This information element shall be present in case of handover procedure if timing advance is enabled. Calculated timing advance value for the new cell after handover in a synchronous TDD network
START	OP		START 10.3.3.38	This information element is not needed for transparent mode ~~Rbs~~RBs if prior to this procedure there exists one RB using RLC-TM.
RB Information elements				
COUNT-C activation time	OP		Activation time 10.3.3.1	Used for radio bearers mapped on RLC-TM.
Radio bearer uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	
Uplink counter synchronisation info	OP			
>RB with PDCP information list	OP	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP in the case of lossless SRNS relocation
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	
>START list	MP	1 to <maxCNdomains>		START [40] values for all CN domains.
>>CN domain identity	MP		CN domain identity 10.3.1.1	
>>START	MP		START 10.3.3.38	START value to be used in this CN domain.

10.2.43 SECURITY MODE COMMAND

This message is sent by UTRAN to start or reconfigure ciphering and/or integrity protection parameters.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN to UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Security capability	MP		Security capability 10.3.3.37	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	Only present if ciphering shall be controlled
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	Only present if integrity protection shall be controlled
CN Information elements				
CN domain identity	MP		CN domain identity 10.3.1.1	Indicates which cipher and integrity protection keys are applicable
Other information elements				
UE system specific security capability	CH	1 to <maxInterSysMessages>		This IE is included if the IE "Inter-RAT UE radio access capability" was included in RRC CONNECTION SETUP COMPLETE message
>Inter-RAT UE security capability	MP		Inter-RAT UE security capability 10.3.8.8a	

10.2.44 SECURITY MODE COMPLETE

This message is sent by UE to confirm the reconfiguration of ciphering and/or integrity protection.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Uplink integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	
RB Information elements				
Radio bearer uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	

10.2.45 SECURITY MODE FAILURE

This message is sent to indicate a failure to act on a received SECURITY MODE CONTROL message.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Failure cause	MP		Failure cause and error information 10.3.3.14	

10.2.56 UE CAPABILITY INFORMATION

This message is sent by UE to convey UE specific capability information to the UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	OP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxInterSysMessages>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability10.3.8.7	

10.2.57 UE CAPABILITY INFORMATION CONFIRM

This message is sent by UTRAN to confirm that UE capability information has been received.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied

10.3.3.1 Activation time

Activation Time defines the frame number/time at which the operation/changes caused by the related message shall take effect. Values between 0 and 255 indicate the absolute value of CFN (Connection Frame Number) of that frame number/time.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Activation time	MP		Integer(0..255)	CFN [10]

10.3.3.4 Ciphering Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm	MP		Enumerated (UEA0, UEA1)	

10.3.3.5 Ciphering mode info

This information element contains the ciphering specific security mode control information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering mode command	MP		Enumerated (start/restart, stop)	
Ciphering algorithm	CV-*notStop*		Ciphering algorithm 10.3.3.4	
Ciphering activation time for DPCH	OP		Activation time 10.3.3.1	Used for radio bearers mapped on RLC-TM. Only applicable if the UE is already in CELL_DCH state
Radio bearer downlink ciphering activation time info	OP		RB activation time info, 10.3.4.13	Used for radio bearers mapped on RLC-AM or RLC-UM

Condition	Explanation
notStop	The IE is mandatory present if the IE "Ciphering mode command" has the value "start/restart", otherwise the IE is not needed in the message.

10.3.3.16 Integrity check info

The Integrity check info contains the RRC message sequence number needed in the calculation of XMAC-I [40] and the calculated MAC-I.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message authentication code	MP		bit string(32)	MAC-I [40]. The Message Authentication Code bits are numbered b0-b31, where b0 is the least significant bit. The 27 MSB of the IE shall be set to zero and the 5 LSB of the IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.
RRC Message sequence number	MP		Integer (0..15)	The local RRC hyper frame number (RRC HFN) is concatenated with the RRC message sequence number to form the input parameter COUNT-I for the integrity protection algorithm. The IE value shall be set to zero when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.

10.3.3.17 Integrity protection activation info

This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RRC message sequence number list	MP	4 to 5		The RRC sequence number when a new integrity protection configuration shall be applied, for CCCH (=RB0) and signalling radio bearers in the order RB0, RB1, RB2, RB3, RB4. The value for RB1 shall be ignored if this IE was included in a RRC message sent on RB1. The value for RB2 shall be ignored if this IE was included in a RRC message sent on RB2.
>RRC message sequence number	MP		Integer (0.. 15)	

10.3.3.18 Integrity protection Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection algorithm	MP		Enumerated (UIA1)	

10.3.3.19 Integrity protection mode info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection mode command	MP		Enumerated(start, modify)	
Downlink integrity protection activation info	CV-*modify*		Integrity protection activation info 10.3.3.17	
Integrity protection algorithm	OP		Integrity protection algorithm 10.3.3.18	
Integrity protection initialisation number	CV-*start*		Bit string(32)	FRESH [40]

Condition	Explanation
Start	The IE is mandatory present if the IE "Integrity protection mode command" has the value "start ", otherwise it is not needed in the message.
Modify	The IE is mandatory present if the IE "Integrity protection mode command" has the value "modify" and not needed otherwise.

10.3.3.36 RRC transaction identifier

This IE contains an identification of the RRC procedure transaction local for the type of the message this IE was included within.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RRC transaction identifier	MP		Integer (0..3)	

10.3.3.37 Security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm capability	MP			
>UEA0	MP		Boolean	The value TRUE means that an unciphered connection after the Security mode control procedure is accepted by the UE.
>UEA1	MP		Boolean	The value TRUE means that UEA1, Kasumi, is supported
>Spare	MP	14	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.
Integrity protection algorithm capability	MP			
>UIA1	MP		Boolean	The value TRUE means that UIA1, Kasumi, is supported
>Spare	MP	15	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.

NOTE: The UE shall support at least one UEAx other than UEA0 and one UIAx.

10.3.3.38 START

There is a START value per CN domain. The START is used to initialise the 20 MSBs of all hyper frame numbers (MAC-d HFN, RLC UM HFN, RLC AM HFN, RRC HFN) for a CN domain.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
START	MP		Bit string (20)	The START [40] bits are numbered b0-b19, where b0 is the least significant bit.

10.3.4.8 RAB info

This IE contains information used to uniquely identify a radio access bearer.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB identity	MP		RAB identity 10.3.1.14	
CN domain identity	MP		CN domain identity 10.3.1.1	
NAS Synchronization Indicator	OP		NAS Synchronization indicator 10.3.4.12	
Re-establishment timer	MP		Re-establishment timer 10.3.3.30	

10.3.4.10 RAB information for setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB info	MP		RAB info 10.3.4.8	
RB information to setup list	MP	1 to <maxRBperRAB>		
>RB information to setup	MP		RB information to setup 10.3.4.20	

10.3.4.13 RB activation time info

This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Radio bearer activation time	MP	1 to <maxRB>		
>RB identity	MP		RB identity 10.3.4.16	
>RLC sequence number	MP		Integer (0.. 4095)	RLC SN [16] . Used for radio bearers mapped on RLC AM and UM

10.3.4.14 RB COUNT-C MSB information

The MSB of the COUNT-C values of the radio bearer.

Information Element/Group name	Needed	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
COUNT-C-MSB-uplink	MP		Integer (0.. 2^25-1)	25 MSBs from COUNT-C associated to this RB
COUNT-C-MSB-downlink	MP		Integer (0.. 2^25-1)	25 MSBs from COUNT-C associated to this RB

10.3.4.15 RB COUNT-C information

The COUNT-C values of the radio bearer.

Information Element/Group name	Needed	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
COUNT-C-uplink	MP		Integer (0.. 2^32-1)	
COUNT-C-downlink	MP		Integer (0.. 2^32-1)	

10.3.4.16 RB identity

An identification number for the radio bearer affected by a certain message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MP		Integer(1..32)	Values 1-4 shall only be used for signalling radio bearers. The IE value minus one shall be used as BEARER in the ciphering algorithm.

10.3.4.20 RB information to setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
PDCP info	OP		PDCP info 10.3.4.2	
CHOICE *RLC info type*	MP			
>RLC info			RLC info 10.3.4.23	
>Same as RB			RB identity 10.3.4.16	Identity of RB with exactly the same RLC info IE values
RB mapping info	MP		RB mapping info 10.3.4.21	

NOTE This information element is included within IE "Predefined RB configuration"

10.3.4.24 Signalling RB information to setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MD		RB identity 10.3.4.16	Default value is specified in subclause 8.6.4.1
CHOICE *RLC info type*	MP			
>RLC info			RLC info 10.3.4.23	
>Same as RB			RB identity 10.3.4.16	Identity of RB with exactly the same RLC info IE values
RB mapping info	MP		RB mapping info 10.3.4.21	

NOTE This information element is included within IE "Predefined RB configuration"

13.4 UE variables

13.4.1 CIPHERING_STATUS

This variable contains information about the current status of ciphering in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Status for each CN domain	MP	<1 to maxCNDomains>		
>CN domain identity	MP		CN domain identity 10.3.1.1	
>Status	MP		Enumerated(Not started, Started)	Set to "Not started" when entering UTRA RRC connected mode. Set to "Not started" when leaving UTRA RRC connected mode.
Reconfiguration	MP		Boolean	TRUE means an RRC procedure performing reconfiguration of ciphering is ongoing. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.5 ESTABLISHED_RABS

This variable is used to store information about the established radio access bearers and signalling radio bearers in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB information	OP	1 to <maxRABsetup>		For each RAB established. Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared when leaving UTRA RRC connected mode.
>RAB info	MP		RAB info 10.3.4.8	
>RB information	MP	1 to <maxRBper RAB>		For each RB belonging to the RAB
>>RB identity	MP		RB identity 10.3.4.16	
>>Subflow	MP		Integer(0..<maxSubflowcount>)	Reference to the RAB subflow implemented by this RB
>>RB started	MD		Enumerated(stopped, started)	Default value is started
Signalling radio bearer information	OP	1 to <maxSRBsetup>		In the order of RB0 and upwards. Cleared when leaving UTRA RRC connected mode.
>RB started	MD		Enumerated(stopped, started)	Default value is started

13.4.8a INCOMPATIBLE_SECURITY_RECONFIGURATION

This variable indicates whether an incompatible simultaneous reconfiguration of a security function has been received.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Incompatible security reconfiguration	MP		Boolean	TRUE: An incompatible simultaneous security reconfiguration has been detected. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.9a INTEGRITY_PROTECTION_ACTIVATION_INFO

This variable contains information to be sent to UTRAN about when a new integrity protection configuration shall be activated in the uplink for signalling radio bearers in case of modification of integrity protection.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink Integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.10 INTEGRITY_PROTECTION_INFO

This variable contains information about the current status of the integrity protection in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~Historical status~~	~~MP~~		~~Enumerated(Never been active, Has been active)~~	~~Set to "Never been active" when entering UTRA RRC connected mode.~~
Status	MP		Enumerated(Not started, Started)	Set to "Not started" when entering UTRA RRC connected mode. Set to "Not started" when leaving UTRA RRC connected mode.
Reconfiguration	MP		Boolean	TRUE means a reconfiguration of integrity protection is ongoing. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.
Signalling radio bearer specific integrity protection information	OP	1 to <maxSRBsetup>		When integrity protection is started, status information for RB0- RB4 in that order. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
>Uplink RRC HFN	MP		Bit string (28)	
>Downlink RRC HFN	MP		Bit string (28)	
>Uplink RRC Message sequence number	MP		Integer (0..15)	
>Downlink RRC Message sequence number	OP		Integer (0..15)	

13.4.11 INVALID_CONFIGURATION

This variable indicates whether a received message contained an invalid configuration, by means of invalid values or invalid combinations of information elements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Invalid configuration	MP		Boolean	TRUE: An invalid configuration has been detected. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.11a LATEST_CONFIGURED_CN_DOMAIN

This variable stores the CN-domain that was most recently configured to be used for ciphering and integrity protection.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Latest configured CN domain	OP		CN domain identity 10.3.1.1	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

13.4.20 RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO

This variable contains information to be sent to UTRAN about when a new ciphering configuration shall be activated in the uplink for radio bearers using RLC-AM or RLC-UM.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.22 START_THRESHOLD

This variable contains information about the maximum allowed value of the START for a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
THRESHOLD	OP		Integer (0..1048576)	20 bits. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

13.4.23 START_VALUE_TO_TRANSMIT

This variable contains the value of START for new radio bearer(s) to be transmitted in a response message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
START	OP		START 10.3.3.38	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.27g UE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to < maxInterSysMessages >	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

3GPP TSG-RAN WG2 Meeting #25
Makuhari, Japan, 26th – 30th November, 2001

Tdoc R2-012770

CR-Form-v3

CHANGE REQUEST

⌘ **25.331 CR 1214** ⌘ rev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Security baseline for corrections	
Source: ⌘	TSG-RAN WG2	
Work item code: ⌘	TEI	***Date:*** ⌘ 2001-12-05
Category: ⌘	**A**	***Release:*** ⌘ REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ These are clarifications that are needed in order to clearly interpret the specification of security for both UE and UTRAN.

Summary of change: ⌘

- This document is based on Ericsson R2-012600 and is updated to include the results and conclusions of the security related discussions in the early part of the week for this meeting (RAN2#25). This document will be used as a base from which one CR on security can be written for approval to RAN2#25. This tdoc includes all agreed changes from the security drafting group, using different tracking user names to follow the changes. The document is distributed with the Word tracking option "Highlight changes on screen" as OFF. The complete changes can be seen easily in cyan (light blue).

8.1.3.6

Default setting THRESHOLD defined.

8.1.4.6 and 8.1.6.6

RRC SN is now incremented on retransmission

8.1.12.2.1

Clarified that the IE START may be used as well as the START list

Clarification of behaviour when SRB and RB are suspended.

8.1.12.2.2

Removed the indication to higher layers. This is now sent when we receive the SECURITY MODE COMPLETE. Moved to 8.1.12.5

8.1.12.3

Text restructured and IE specific parts moved to 8.3.6.4 and 8.3.6.5.

Redundant UE variable “Historical Status” is removed.

Procedures relating to reception of new keys is moved to a new section 8.1.12.3.

8.1.12.4c

Reset of IE reconfiguration added.

8.1.12.5

Resumption of RB and indication of new security configuration to upper layers now included in this section.

8.1.15.1

Clarification of how RB COUNT-C values are to be handled.

8.2.2.3

IE name corrected to “Uplink integrity protection activation info”, and exclusion of default now removed.

8.2.2.4

Correction to include RB4 in general SRB procedures.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.2.2.5

Clarification of UTRAN behaviour when response received and ciphering configuration has been ordered.

8.3.1.6

Text added to describe restart of ciphering on TM RB on transition to CELL_DCH state.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.3.3

IE name corrected to “Uplink integrity protection activation info”, and exclusion of default now removed.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.4.3.

IE name corrected to “Uplink integrity protection activation info”, and exclusion of default now removed.

Resumption of suspended RB and SRB added in case of ciphering reconfiguration.

8.3.6.3

Clarification of when to apply ciphering on reception of HANDOVER TO UTRAN COMMAND

8.5.2

It is clarified that the START value stored in the USIM should not exceed THRESHOLD

8.5.9

Clarification of which RB COUNT values are used in the calculation of START.

8.5.10

UTRAN shall changed to should

In all cases RRC SN is now increamented the text allowing exceptions is removed.

8.5.10.1

References to other sections that caused “cylic” procedures removed.

8.5.10.2

Clarification about when UTRAN will apply integrity configurations

8.6.3.4

Text restructured and invalid configuration checking grouped.

New invalid configurations added.

Handling of LATEST_CONFIGURED_CN_DOMAIN corrected.

Clarification of how to apply ciphering configuration changes to TM RB

8.6.3.5

Text restructured and invalid configuration checking grouped.

Initialisation of HFN move to 8.1.12.3

New invalid configuration checks added

It is clarified which message commands can be receieved in different message types.

8.6.4.1

TM SRB text removed

8.6.4.3

Clarification of when to start incrementing COUNT-C values.

Removed refernce to COUNT-I which is not affected by this procedure.

		13.4.10 Redundant IE deleted. **Isolated impact**: The CR has isolated impact; only the function to be corrected is affected.
Consequences if not approved:	⌘	The possibility that different UE and UTRAN implementations will interpret the specification of security differently.

Clauses affected:	⌘	8.1.3.6, 8.1.4.6, 8.1.6.6, 8.1.12.1, 8.1.12.2.1, 8.1.12.2.2, 8.1.12.3, 8.1.12.3.1 (new), 8.1.12.4a, 8.1.12.4b, 8.1.12.4c, 8.1.12.5, 8.1.12.6, 8.1.15.1, 8.2.2.3, 8.2.2.4, 8.2.2.5, 8.3.1.6, 8.3.3.3, 8.3.4.3, 8.3.6.3, 8.5.2, 8.5.9, 8.5.10, 8.5.10.1, 8.5.10.2, 8.6.3.4, 8.6.3.5, 8.6.4.1, 8.6.4.2, 8.6.4.3, 8.6.4.8, 8.6.5.1, 10.2.34, 13.4.10		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1213r1
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

SECTIONS INCLUDED IN THIS CR

8.1.3.6 Reception of an RRC CONNECTION SETUP message by the UE

The UE shall compare the value of the IE "Initial UE identity" in the received RRC CONNECTION SETUP message with the value of the variable INITIAL_UE_IDENTITY.

If the values are different, the UE shall:

- ignore the rest of the message;

If the values are identical, the UE shall:

- stop timer T300, and act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following;
  - if the UE will be in the CELL_FACH state at the conclusion of this procedure:
    - if the IE "Frequency info" is included:
      - select a suitable UTRA cell according to [4] on that frequency;
    - select PRACH according to subclause 8.5.17;
    - select Secondary CCPCH according to subclause 8.5.19;
- perform the physical layer synchronisation procedure as specified in [29];
- enter a state according to subclause 8.6.3.3;
- submit an RRC CONNECTION SETUP COMPLETE message to the lower layers on the uplink DCCH after successful state transition per subclause 8.6.3.3, with the contents set as specified below:
  - set the IE "RRC transaction identifier" to
    - the value of "RRC transaction identifier" in the entry for the RRC CONNECTION SETUP message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry.
  - if the USIM is present:
    - set the "START" for each CN domain in the IE "START list" in the RRC CONNECTION SETUP COMPLETE message with the corresponding START value that is stored in the USIM [50]; and then
    - set the START value stored in the USIM [50] for any CN domain to the value "THRESHOLD" of the variable START_THRESHOLD;
  - if the USIM is not present:
    - set the "START" for each CN domain in the IE "START list" in the RRC CONNECTION SETUP COMPLETE message to zero;
  - set the value of "THRESHOLD" in the variable "START_THRESHOLD" to the default value [40].
  - retrieve its UTRA UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED; and then
  - include this in IE "UE radio access capability" and IE "UE radio access capability extension", provided this IE is included in variable UE_CAPABILITY_REQUESTED;
  - retrieve its inter-RAT-specific UE radio access capability information elements from variable UE_CAPABILITY_REQUESTED; and then
  - include this in IE "UE system specific capability".

When the RRC CONNECTION SETUP COMPLETE message has been submitted to lower layers for transmission the UE shall:

- if the UE has entered CELL_FACH state:
  - start timer T305 using its initial value if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- store the contents of the variable UE_CAPABILITY_REQUESTED into the variable UE_CAPABILITY_TRANSFERRED;
- initialise variables upon entering UTRA RRC connected mode as specified in subclause 13.4;
- consider the procedure to be successful;

And the procedure ends.

8.1.4.6 Expiry of timer T308, unacknowledged mode transmission

When in state CELL_DCH and the timer T308 expires, the UE shall:

- increment V308 by one;
- if V308 is equal to or smaller than N308:
  - prior to retransmitting the RRC CONNECTION RELEASE COMPLETE message:
    - if the IE “Status” in the variable INTEGRITY_PROTECTION_INFO has the value “Started":
      - include the same IEs as in the last unsuccessful attempt of this message, except for the IE “Integrity check info”, which is modified as follows;
        - increment the "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO by one;
        - set the IE “RRC Message sequence number” in the IE “Integrity check info” by the value of the "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO in this message;
        - recalculate the IE “Message authentication code” in the IE “Integrity check info” in this message, in accordance with subclause 8.5.10.3;
    - else
      - include the same IEs as in the last unsuccessful attempt of this message~~, except the IE “Integrity check info”~~;
  - ~~retransmit~~ send the RRC CONNECTION RELEASE COMPLETE message on signalling radio bearer RB1;~~, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB1 in the variable INTEGRITY_PROTECTION_INFO;~~
- if V308 is greater than N308:
  - release all its radio resources;
  - indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;

- perform the actions specified in subclause 8.5.2 when entering idle mode;
- and the procedure ends.

8.1.6.6 T304 timeout

Upon expiry of timer T304, the UE shall check the value of V304 and:

- if V304 is smaller than or equal to N304:
  - prior to retransmitting the UE CAPABILITY INFORMATION message:
    - if the IE “Status” in the variable INTEGRITY_PROTECTION_INFO has the value “Started":
      - include the same IEs as in the last unsuccessful attempt of this message, except for the IE “Integrity check info”, which is modified as follows;
        - increment the "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO by one;
        - set the IE “RRC Message sequence number” in the IE “Integrity check info” by the value of the "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO in this message;
        - recalculate the IE “Message authentication code” in the IE “Integrity check info” in this message, in accordance with subclause 8.5.10.3;
    - else
      - include the same IEs as in the last unsuccessful attempt of this message~~, except the IE “Integrity check info”~~;
  - ~~retransmit~~ send ~~a~~ the UE CAPABILITY INFORMATION message on signalling radio bearer RB2;~~with the IEs as set in the last unsuccessful attempt, without incrementing "Uplink RRC Message sequence number" for signalling radio bearer RB2 in the variable INTEGRITY_PROTECTION_INFO;~~
  - restart timer T304;
  - increment counter V304;
- if V304 is greater than N304:
  - initiate the Cell update procedure as specified in subclause 8.3.1, using the cause "Radio link failure".

8.1.12 Security mode control

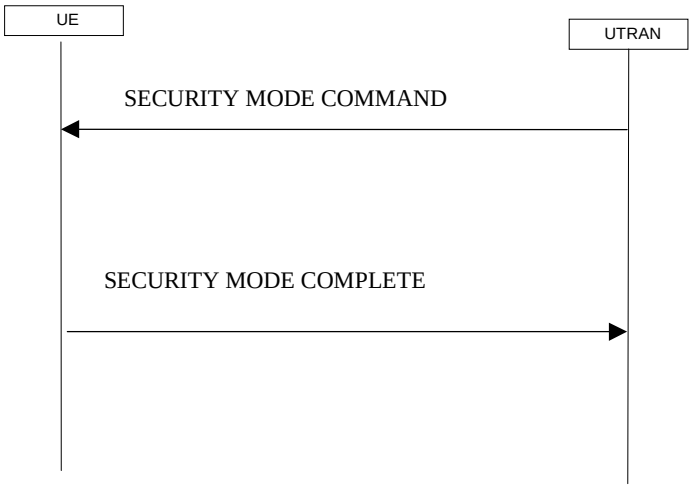

Figure 18: Security mode control procedure

8.1.12.1 General

The purpose of this procedure is to trigger the stop or start of ciphering or to command the restart of the ciphering with a new ciphering configuration, for ~~all~~ the radio bearers of one CN domain and for all signalling radio bearers.

It is also used to start integrity protection or to modify the integrity protection configuration for all signalling radio bearers.

8.1.12.2 Initiation

8.1.12.2.1 Ciphering configuration change

To stop or start/restart ciphering, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the most recent ciphering configuration. If no such ciphering configuration exists then the SECURITY MODE COMMAND is not ciphered.

Prior to sending the SECURITY MODE COMMAND, for the CN domain indicated in the IE "CN domain identity" in the SECURITY MODE COMMAND, UTRAN should:

- if this is the first SECURITY MODE COMMAND sent for this RRC connection:
  - use the value "START" in the most recently received IE "START list" or IE "START" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
    - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
    - setting the remaining bits of the hyper frame numbers equal to zero;
- suspend all radio bearers using RLC-AM ~~and~~ or RLC-UM ~~for this CN domain~~;
- suspend all signalling radio bearers using RLC-AM ~~and~~ or RLC-UM, except the signalling radio bearer used to send the SECURITY MODE COMMAND message on the downlink DCCH in RLC-AM;
- not transmit RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info" on all suspended radio bearers and all suspended signalling radio bearers;
- apply the old ciphering configuration for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info" included in the IE "Ciphering mode info";

- apply the new ciphering configuration for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info" included in the IE "Ciphering mode info".

- set, for the signalling radio bearer used to send the SECURITY MODE COMMAND, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;

- if a transparent mode radio bearer for this CN domain exists then ~~and the UE is in CELL_DCH state~~ include the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info" ~~when a DPCH exists and is used for radio bearers using transparent mode RLC~~, at which time the new ciphering configuration shall be applied;

- set, for each suspended radio bearer and signalling radio bearer that has no pending ciphering activation time set by a previous security mode control procedure, an "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info", at which time the new ciphering configuration shall be applied;

- set, for each suspended radio bearer and signalling radio bearer that has a pending ciphering activation time set by a previous security mode control procedure, the "RLC send sequence number" in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info" to the value used in the previous security mode control procedure, at which time the latest ciphering configuration shall be applied.

- transmit the SECURITY MODE COMMAND message on the downlink DCCH in AM RLC;

~~While suspended, radio bearers and signalling radio bearers shall not deliver RLC PDUs with sequence number greater than or equal to the number in IE "Radio bearer downlink ciphering activation time info".~~

~~When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN shall:~~

- ~~resume all the suspended radio bearers and signalling radio bearers. The old ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number less than the number indicated in the IE "Radio bearer downlink ciphering activation time info", as sent to the UE. The new ciphering configuration shall be applied for the transmission of RLC PDUs with RLC sequence number greater than or equal to the number indicated in IE "Radio bearer downlink ciphering activation time info", sent to the UE.~~

8.1.12.2.2 Integrity protection configuration change

To start or modify integrity protection, UTRAN sends a SECURITY MODE COMMAND message on the downlink DCCH in AM RLC using the new integrity protection configuration.

~~When the successful delivery of the SECURITY MODE COMMAND has been confirmed by RLC, UTRAN should:~~

- ~~for the signalling radio bearers:~~

  - ~~send an indication to upper layers that the new integrity protection configuration has been activated when the activation time has elapsed.~~

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall ~~perform the actions for the received information elements according to subclause 8.6.~~:

If the IE "Ciphering mode info" and the IE "Integrity protection mode info" are both not included in the SECURITY MODE COMMAND, ~~, the UE shall~~:

- set the variable INVALID_CONFIGURATION to TRUE.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, ~~, the UE shall~~:

- set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";

- if ~~prior to the reception of SECURITY MODE COMMAND, the value of the IE "Status" in the variable "CIPHERING_STATUS" of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is~~

"Not started" and the value of the IE "Historical statusStatus" in the variable "INTEGRITY_PROTECTION_INFO" is "Never been activeNot started":

- use the value "START" in the most recently sent IE "START list" or IE "START" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
  - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
  - setting the remaining bits of the hyper frame numbers equal to zero;

- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to transmit the SECURITY MODE COMPLETE message on the uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity"; and

- set the "RLC send sequence number" in IE "Radio bearer uplink ciphering activation time info", at which time the new ciphering configuration shall be applied;

- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry; Note: Indentation changed to B2
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":

  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;

  - perform the actions as specified in subclause 8.6.3.4;

- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info": with the IE "Integrity protection mode command" set to "Modify":

  - if the IE "Integrity protection mode command" is set to "Modify":

    - include and set the IE "Integrity Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO; Note: Indentation changed to B3

  - perform the actions as specified in subclause 8.5.10.18.6.3.5;

- for radio bearers using RLC-TM:

  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;

  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;

- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

Prior to sending the SECURITY MODE COMPLETE message, set the information elements as specified below:

- use the old ciphering configuration for this message;
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
  - include the IE "Radio bearer uplink ciphering activation time info";
- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":
  - include the IE "Uplink integrity protection activation info";

- start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message;

- transmit the SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC;

- send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations; Note: Indentation changed to B1

- if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message: Note: Indentation changed to B1

  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message; Note: Indentation changed to B2

- wWhen the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:;

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":

  - allow the transmission of RRC messages on all signalling radio bearers with RRC SN greater than or equal to the value in the "RRC message sequence number list" indicated for each signalling radio bearer in the IE "Uplink integrity protection activation info" of the response message;

  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and

  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

  - the procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;

- notify upper layers upon change of the security configuration;

- and the procedure ends.

[NOTE: TEXT ON NEW KEYS HAS BEEN MOVED TO A NEW CHAPTER]

- if a new security key set has been received for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN:

  - set the START value for this CN domain to 0.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received:

  - in the downlink:

    - use the new key;

    - set the IE "Downlink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero when the RRC sequence number in a received RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

- ~~in the uplink:~~
  - ~~use the new key;~~
  - ~~set the IE "Uplink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero when the RRC sequence number in a transmitted RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Uplink integrity protection activation info";~~

- ~~if a new ciphering key is available:~~
  - ~~for radio bearers using RLC-TM:~~
    - ~~use the new key in uplink and downlink;~~
    - ~~set the HFN component of the COUNT-C to zero at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";~~
  - ~~for radio bearers using RLC-AM and RLC-UM:~~
    - ~~in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":~~
      - ~~use the new key;~~
      - ~~set the HFN component of the downlink COUNT-C to zero;~~
    - ~~in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":~~
      - ~~use the new key;~~
      - ~~set the HFN component of the uplink COUNT-C to zero.~~

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or if the IE "GSM security capability" is not included in the SECURITY MODE COMMAND and is included in the variable UE_CAPABILITY_TRANSFERRED~~, the UE shall~~:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- and the procedure ends.

8.1.12.3.1 New ciphering and integrity protection keys [NEW SECTION]

~~It should be noted that UTRAN should apply and use the same rules as specified in this subclause for the UE below in order to ensure that the change to the new security configuration is done in a correct and synchronised way between UE and UTRAN.~~

If a new security keyset (new ciphering and integrity protection keys) has been received from the upper layers [40] for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, the UE shall:

- set the START value for this CN domain to zero;
- for each signalling radio bearer~~, the UE shall~~:

- for integrity protection in the downlink:
  - ~~when the RRC sequence number in a received RRC message for this signalling radio bearer is equal to one less than or greater than the activation time minus one, where the activation time is as indicated in IE "Downlink integrity protection activation info" as included in the IE "Integrity protection mode info":~~
    - ~~if a pending activation time exists for this signalling radio bearer~~
      - ~~release the old integrity protection configuration for this signalling radio bearer;~~
  - when the RRC sequence number in a received RRC message for this signalling radio bearer ~~is not less than~~ is equal to or greater than the activation time as indicated in IE "Downlink integrity protection activation info" as included in the IE "Integrity protection mode info" ~~(ie the new integrity key is used for the first time)~~:
    - use the new integrity key;
    - for this signalling radio bearer, set the IE "Downlink RRC HFN" in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero;
- for integrity protection in the uplink:
  - ~~when the RRC sequence number in a received RRC message for this signalling radio bearer is equal to one less than the activation time minus one, where the activation time is as indicated in IE "Uplink integrity protection activation info" as included in the IE "Integrity protection mode info" (ie the new integrity key is used for the first time):~~
    - ~~release the old integrity protection configuration for this signalling radio bearer;~~
  - when the RRC sequence number in a to be ~~received~~transmitted RRC message for this signalling radio bearer is ~~not less than~~ equal to the activation time as indicated in IE "Uplink integrity protection activation info" included in the IE "Integrity protection mode info"
    - use the new integrity key;
    - for this signalling radio bearer, set the IE "Uplink RRC HFN" in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero;

- for each signalling radio bearer and for each radio bearer~~, the UE shall~~for this CN domain:
  - if the IE “Status” in the variable CIPHERING_STATUS has the value “Started” for this CN domain, then for ciphering on radio bearers using RLC-TM:
    - at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info":
      - use the new key in uplink and downlink;
      - set the HFN component of the COUNT-C to zero;
  - if the IE “Status” in the variable CIPHERING_STATUS has the value “Started” for this CN domain, then for ciphering on radio bearers and signalling radio bearers using RLC-AM and RLC-UM:
    - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
      - use the new key;
      - set the HFN component of the downlink COUNT-C to zero;
    - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
      - use the new key;
      - set the HFN component of the uplink COUNT-C to zero.

8.1.12.4 Void

8.1.12.4a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION becomes set to TRUE of the received SECURITY MODE COMMAND message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC, using the ciphering and integrity protection configurations prior to the reception of this SECURITY MODE COMMAND;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- when the response message has been submitted to lower layers for transmission:

~~- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - and the procedure ends.

8.1.12.4b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received SECURITY MODE COMMAND message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE:

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC, using the ciphering and integrity protection configurations prior to the reception of this SECURITY MODE COMMAND;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "cell update occurred";
- when the response message has been submitted to lower layers for transmission:

- ~~when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received; and
  - the procedure ends.

8.1.12.4c Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE due to the received SECURITY MODE COMMAND message, the UE shall:

- transmit a SECURITY MODE FAILURE message on the DCCH using AM RLC after setting the IEs as specified below;
  - set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "invalid configuration";
- when the response message has been submitted to lower layers for transmission:

- ~~when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - set the variable INVALID_CONFIGURATION to FALSE;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE~~ for the CN domain as indicated in the LATEST_CONFIGURED_CN_DOMAIN~~;
  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - and the procedure ends.

8.1.12.5 Reception of SECURITY MODE COMPLETE message by the UTRAN

UTRAN should apply integrity protection on the received SECURITY MODE COMPLETE message and all subsequent messages with the new integrity protection configuration, if changed. When UTRAN has received a SECURITY MODE COMPLETE message and the integrity protection has successfully been applied, UTRAN ~~shall~~should:

- send an indication to upper layers that the new integrity protection configuration has been activated;
- resume in the downlink, all suspended radio bearers and all signalling radio bearers;
- for radio bearers using RLC-AM or RLC-UM:
  - use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;

- use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
- if an RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been received by UTRAN before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment;

- for radio bearers using RLC-TM:
  - use the old ciphering configuration for the received RLC PDUs before the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;
  - use the new ciphering configuration for the received RLC PDUs at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info" as included in the SECURITY MODE COMMAND;
- and the procedure ends.

8.1.12.6 Invalid SECURITY MODE COMMAND message

If the SECURITY MODE COMMAND message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows:

- transmit a SECURITY MODE FAILURE message on the uplink DCCH using AM RLC;
- set the IE "RRC transaction identifier" in the SECURITY MODE FAILURE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry;
- set the IE "failure cause" to the cause value "protocol error";
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.
- when the response message has been submitted to lower layers for transmission:

~~- when the successful delivery of the SECURITY MODE FAILURE message has been confirmed by RLC:~~

  - continue with any ongoing processes and procedures as if the invalid SECURITY MODE COMMAND message has not been received;
  - and the procedure ends.

8.1.15 Counter check procedure

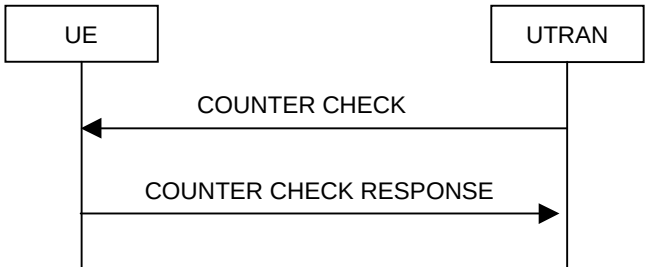

Figure 21: Counter check procedure

8.1.15.1 General

The counter check procedure is used by the UTRAN to perform a local authentication. The purpose of the procedure is to check that the amount of data sent in both directions (uplink and downlink) over the duration of the RRC connection is identical at the UTRAN and at the UE (to detect a possible intruder – a 'man-in-the-middle' – from operating).

This procedure is only applicable to radio bearers, and only to radio bearers using RLC-AM ~~and~~or RLC-UM. It should be noted that this requires that the COUNT-C values for each UL and DL radio bearers using RLC-AM ~~and~~or RLC-UM continue to be incremented even if ciphering is not used. This procedure is not applicable to signalling radio bearers.

~~It should be noted that this requires that the COUNT-C values for each UL and DL radio bearer are maintained even if ciphering is not used. This procedure is only applicable to radio bearers using UM or AM mode of RLC. In this version, this procedure is not applied for radio bearers using transparent mode RLC.~~

8.1.15.2 Initiation

The UTRAN monitors the COUNT-C value associated with each radio bearer using UM or AM RLC. The procedure is triggered whenever any of these values reaches a critical checking value. The granularity of these checking values and the values themselves are defined to the UTRAN by the visited network. The UTRAN initiates the procedure by sending a COUNTER CHECK message on the downlink DCCH.

8.1.15.3 Reception of a COUNTER CHECK message by the UE

When the UE receives a COUNTER CHECK message it shall compare the COUNT-C MSB values received in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message to the COUNT-C MSB values of the corresponding radio bearers.

The UE shall:

- set the IE "RRC transaction identifier" in the COUNTER CHECK RESPONSE message to the value of "RRC transaction identifier" in the entry for the COUNTER CHECK message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry.

If

- there is one or more radio bearer(s) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS, which is (are) not included in the IE "RB COUNT-C MSB information"; or
- there is one or more radio bearer(s) included in the IE "RB COUNT-C MSB information", which is (are) not stored in the variable ESTABLISHED_RABS; or
- for any radio bearer (excluding signalling radio bearers) using UM or AM RLC mode stored in the variable ESTABLISHED_RABS and included in the IE "RB COUNT-C MSB information" with COUNT-C MSB values different from the MSB part of the COUNT-C values in the UE

the UE shall:

- include these radio bearers in the IE "RB COUNT-C information" in the COUNTER CHECK RESPONSE message. For any RB which is included in the IE "RB COUNT-C MSB information" in the COUNTER CHECK message but not stored in the variable ESTABLISHED_RABS in the UE, the MSB part of COUNT-C values in the COUNTER CHECK RESPONSE message shall be set identical to COUNT-C-MSB values in the COUNTER CHECK message. The LSB part shall be filled by 0s;

The UE shall:

- submit a COUNTER CHECK RESPONSE message to lower layers for transmission on the uplink DCCH using AM RLC.

When the COUNTER CHECK RESPONSE message has been submitted to lower layers for transmission the procedure ends.

8.1.15.4 Reception of the COUNTER CHECK RESPONSE message by UTRAN

If the UTRAN receives a COUNTER CHECK RESPONSE message that does not contain any COUNT-C values, the procedure ends.

If the UTRAN receives a COUNTER CHECK RESPONSE message that contains one or several COUNT-C values the UTRAN may release the RRC connection.

8.1.15.5 Cell re-selection

If the UE performs cell re-selection anytime during this procedure it shall, without interrupting the procedure:

- initiate the cell update procedure according to subclause 8.3.1.

8.1.15.6 Invalid COUNTER CHECK message

If the UE receives a COUNTER CHECK message, which contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit an RRC STATUS message on the uplink DCCH using AM RLC;
- include the IE "Identification of received message"; and
- set the IE "Received message type" to COUNTER CHECK; and
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the UE COUNTER CHECK message in the table "Rejected transactions" in the variable TRANSACTIONS; and
- clear that entry;
- include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION;
- when the RRC STATUS message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if the invalid COUNTER CHECK message has not been received.

8.2 Radio Bearer control procedures

8.2.1 Radio bearer establishment

See subclause 8.2.2 Reconfiguration procedures.

8.2.2 Reconfiguration procedures

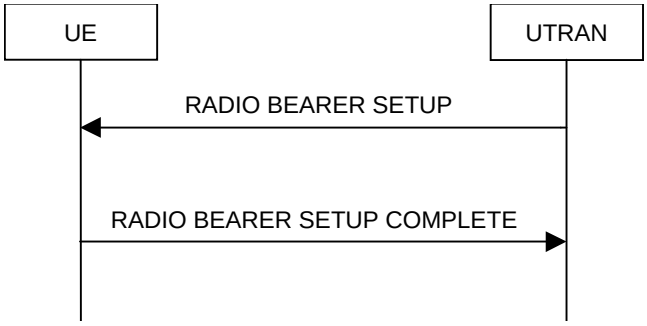

Figure 22: Radio Bearer Establishment, normal case

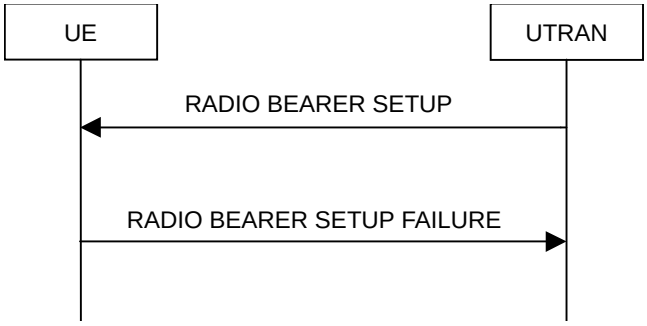

Figure 23: Radio Bearer Establishment, failure case

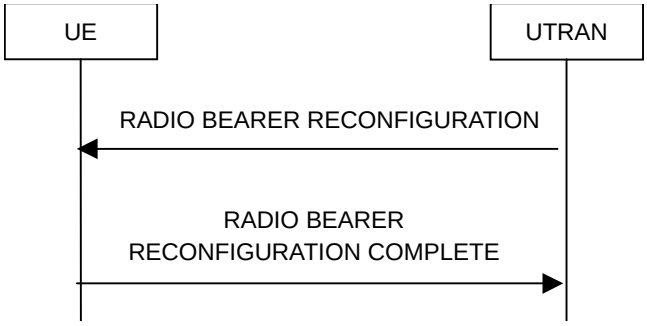

Figure 24: Radio bearer reconfiguration, normal flow

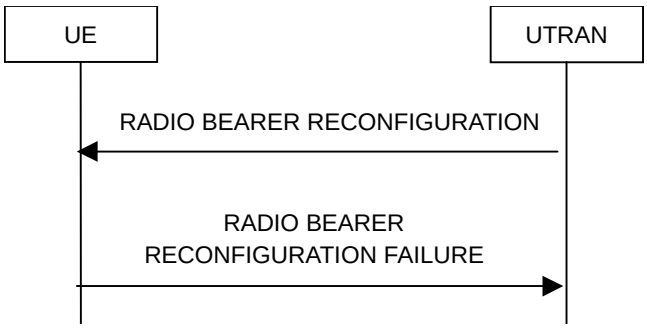

Figure 25: Radio bearer reconfiguration, failure case

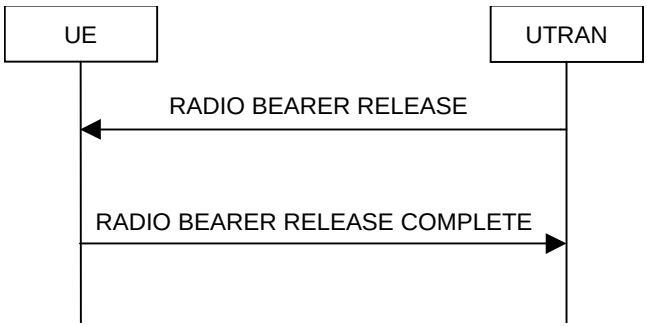

Figure 26: Radio Bearer Release, normal case

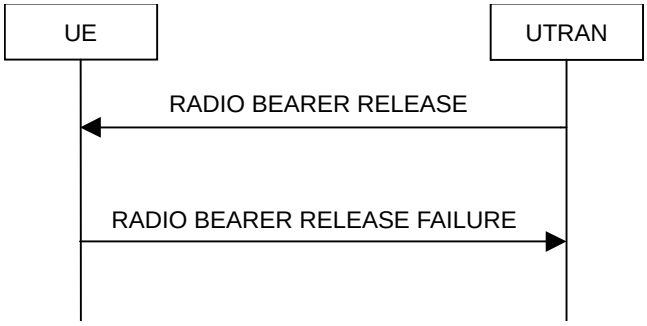

Figure 27: Radio Bearer Release, failure case

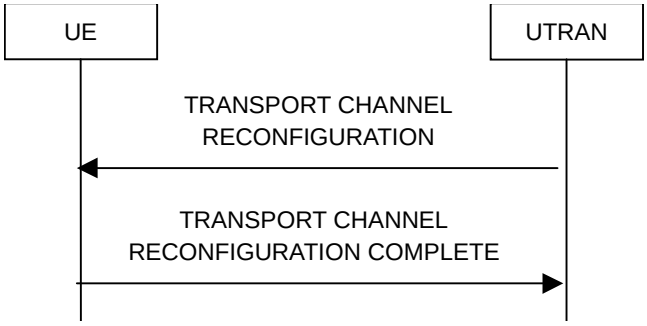

Figure 28: Transport channel reconfiguration, normal flow

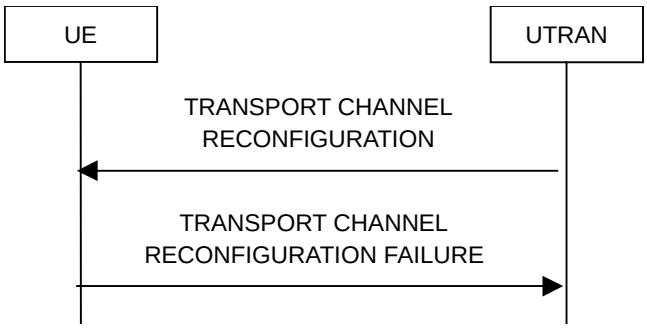

Figure 29: Transport channel reconfiguration, failure case

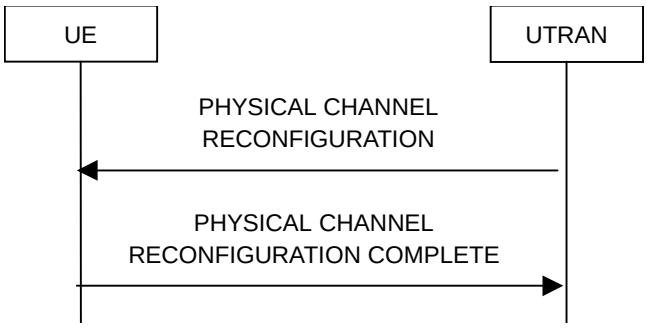

Figure 30: Physical channel reconfiguration, normal flow

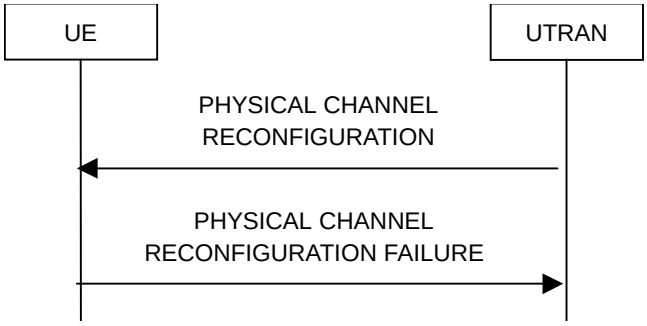

Figure 31: Physical channel reconfiguration, failure case

8.2.2.1 General

Reconfiguration procedures include the following procedures:

- the radio bearer establishment procedure;
- radio bearer reconfiguration procedure;
- the radio bearer release procedure;
- the transport channel reconfiguration procedure; and
- the physical channel reconfiguration procedure.

The radio bearer establishment procedure is used to establish new radio bearer(s).

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer.

The radio bearer release procedure is used to release radio bearer(s).

The transport channel reconfiguration procedure is used to reconfigure transport channel parameters.

The physical channel reconfiguration procedure is used to establish, reconfigure and release physical channels.

While performing any of the above procedures, these procedures may perform a hard handover - see subclause 8.3.5.

8.2.2.2 Initiation

To initiate any one of the reconfiguration procedures, UTRAN should:

- configure new radio links in any new physical channel configuration;
- start transmission and reception on the new radio links;
- for a radio bearer establishment procedure:
  - transmit a RADIO BEARER SETUP message on the downlink DCCH using AM or UM RLC;
- for a radio bearer reconfiguration procedure:
  - transmit a RADIO BEARER RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- for a radio bearer release procedure:
  - transmit a RADIO BEARER RELEASE message on the downlink DCCH using AM or UM RLC;
- for a transport channel reconfiguration procedure:
  - transmit a TRANSPORT CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;

- for a physical channel reconfiguration procedure:
  - transmit a PHYSICAL CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC;
- if the reconfiguration procedure is simultaneous with SRNS relocation procedure:
  - include the IE "Downlink counter synchronisation info"; and
  - if ciphering and/or integrity protection are activated:
    - include new ciphering and/or integrity protection configuration information to be used after reconfiguration;
  - use the downlink DCCH using AM RLC;
- if transport channels are added, reconfigured or deleted in uplink and/or downlink:
  - set TFCS according to the new transport channel(s).
- if transport channels are added or deleted in uplink and/or downlink, and RB Mapping Info applicable to the new configuration has not been previously provided to the UE, the UTRAN should:
  - send the RB Mapping Info for the new configuration.

In the Radio Bearer Reconfiguration procedure UTRAN may indicate that uplink transmission shall be stopped or continued on certain radio bearers. Uplink transmission on a signalling radio bearer used by the RRC signalling (signalling radio bearer RB1 or signalling radio bearer RB2) should not be stopped.

NOTE 1: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure", even if UTRAN does not require the reconfiguration of any RB. In these cases, UTRAN may include only the IE "RB identity" within the IE "RB information to reconfigure".

NOTE 2: The RADIO BEARER RECONFIGURATION message always includes the IE "Downlink information per radio link list", even if UTRAN does not require the reconfiguration of any RL. In these cases, UTRAN may re-send the currently assigned values for the mandatory IEs included within the IE "Downlink information per radio link list ". Moreover, the RADIO BEARER RECONFIGURATION message always includes the IE "Primary CPICH Info" (FDD) or IE "Primary CCPCH Info" (TDD). This implies that in case UTRAN applies the RADIO BEARER RECONFIGURATION message to move the UE to CELL_FACH state, it has to indicate a cell. However, UTRAN may indicate any cell; the UE anyhow performs cell selection and notifies UTRAN if it selects another cell than indicated by UTRAN.

If the IE "Activation Time" is included, UTRAN should set it to a value taking the UE performance requirements into account.

UTRAN should take the UE capabilities into account when setting the new configuration.

If the message is used to initiate a transition from CELL_DCH to CELL_FACH state, the UTRAN may assign a common channel configuration of a given cell and C-RNTI to be used in that cell to the UE.

8.2.2.3 Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE or TRANSPORT CHANNEL RECONFIGURATION or PHYSICAL CHANNEL RECONFIGURATION message by the UE

The UE shall be able to receive any of the following messages:

- RADIO BEARER SETUP message; or
- RADIO BEARER RECONFIGURATION message; or
- RADIO BEARER RELEASE message; or
- TRANSPORT CHANNEL RECONFIGURATION message; or

- PHYSICAL CHANNEL RECONFIGURATION message

and perform a hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency.

If the UE receives:

- a RADIO BEARER SETUP message; or
- a RADIO BEARER RECONFIGURATION message; or
- a RADIO BEARER RELEASE message; or
- a TRANSPORT CHANNEL RECONFIGURATION message; or
- a PHYSICAL CHANNEL RECONFIGURATION message

it shall:

- set the variable ORDERED_RECONFIGURATION to TRUE;
- perform the physical layer synchronisation procedure as specified in [29];
- act upon all received information elements as specified in subclause 8.6, unless specified in the following and perform the actions below.

The UE may first release the physical channel configuration used at reception of the reconfiguration message. The UE shall then:

- in FDD, if the IE "PDSCH code mapping" is included but the IE "PDSCH with SHO DCH Info" is not included and if the DCH has only one link in its active set:
  - act upon the IE "PDSCH code mapping" as specified in subclause 8.6 and:
  - infer that the PDSCH will be transmitted from the cell from which the downlink DPCH is transmitted;
- enter a state according to subclause 8.6.3.3.

In case the UE receives a RADIO BEARER RECONFIGURATION message including the IE "RB information to reconfigure" that only includes the IE "RB identity", the UE shall:

- handle the message as if IE "RB information to reconfigure" was absent.

NOTE: The RADIO BEARER RECONFIGURATION message always includes the IE "RB information to reconfigure". UTRAN has to include it even if it does not require the reconfiguration of any RB.

If after state transition the UE enters CELL_DCH state, the UE shall, after the state transition:

- remove any C-RNTI from MAC;
- clear the variable C_RNTI.

If the UE was in CELL_DCH state upon reception of the reconfiguration message and remains in CELL_DCH state, the UE shall:

- if the IE "UL DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "DL DPCH Info for each RL" is absent, not change its current DL Physical channel configuration.

If after state transition the UE enters CELL_FACH state, the UE shall, after the state transition:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];

- if the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selects another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;
- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- use the transport format set given in system information;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;
- if the contents of the variable C_RNTI is empty:
  - perform a cell update procedure according to subclause 8.3.1 using the cause "Cell reselection";
  - when the cell update procedure completed successfully:
    - if the UE is in CELL_PCH or URA_PCH state:
      - initiate a cell update procedure according to subclause 8.3.1 using the cause "Uplink data transmission";
      - proceed as below;

The UE shall transmit a response message as specified in subclause 8.2.2.4, setting the information elements as specified below. The UE shall:

- if the received reconfiguration message included the IE "Downlink counter synchronisation info":
  - re-establish RB2;
  - set the new uplink and downlink HFN of RB2 to MAX(uplink HFN of RB2 | downlink HFN of RB2) + 1~~increment by one the downlink and uplink HFN values for RB2~~;
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";
- if the received reconfiguration message did not include the IE "Downlink counter synchronisation info":
  - if the variable START_VALUE_TO_TRANSMIT is set:
    - include and set the IE "START" to the value of that variable;
  - if the variable START_VALUE_TO_TRANSMIT is not set and the IE "New U-RNTI" is included:
    - calculate the START value according to subclause 8.5.9;

- include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info";

- if the received reconfiguration message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the received reconfiguration message did not contain the IE "Ciphering activation time for DPCH" in IE "Ciphering mode info":
  - if prior to this procedure there exist no transparent mode RLC radio bearers:
    - if, at the conclusion of this procedure, the UE will be in CELL_DCH state; and
    - if, at the conclusion of this procedure, at least one transparent mode RLC radio bearer exists:
      - include the IE "COUNT-C activation time" and specify a CFN value ~~other than the default, "Now",~~ for this IE;
  - if prior to this procedure there exists at least one transparent mode RLC radio bearer:
    - if, at the conclusion of this procedure, no transparent mode RLC radio bearers exist:
      - include the IE "COUNT-C activation time" ~~in the response message~~ and specify a CFN value ~~other than the default, "Now",~~ for this IE;
- set the IE "RRC transaction identifier" to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the variable PDCP_SN_INFO is not empty:
  - include the IE "RB with PDCP information list" and set it to the value of the variable PDCP_SN_INFO;
- in TDD, if the procedure is used to perform a handover to a cell where timing advance is enabled, and the UE can calculate the timing advance value in the new cell (i.e. in a synchronous TDD network):
  - set the IE "Uplink Timing Advance" according to subclause 8.6.6.26;
- if the IE "Integrity protection mode info" was present in the received reconfiguration message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;

If after state transition the UE enters CELL_PCH or URA_PCH state, the UE shall, after the state transition and transmission of the response message:

- if the IE "Frequency info" is included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4] on that frequency;
- if the IE "Frequency info" is not included in the received reconfiguration message:
  - select a suitable UTRA cell according to [4];
- prohibit periodical status transmission in RLC;
- remove any C-RNTI from MAC;
- clear the variable C_RNTI;

- start timer T305 using its initial value if timer T305 is not running and if periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity" in system information block type 1;
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2;
- if the UE enters CELL_PCH state from CELL_DCH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE or the received reconfiguration message did not include the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD):
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure completed successfully:
    - the procedure ends;
- if the UE enters CELL_PCH state from CELL_FACH state, and the received reconfiguration message included the IE "Primary CPICH info" (for FDD) or "Primary CCPCH info" (for TDD), and the UE selected another cell than indicated by this IE:
  - initiate a cell update procedure according to subclause 8.3.1 using the cause "cell reselection";
  - when the cell update procedure is successfully completed:
    - the procedure ends;
- if the UE enters URA_PCH state, and after cell selection the criteria for URA update caused by "URA reselection" according to subclause 8.3.1 is fulfilled:
  - initiate a URA update procedure according to subclause 8.3.1 using the cause "URA reselection";
  - when the URA update procedure is successfully completed:
    - the procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the IE "Downlink counter synchronization info" was included in the reconfiguration message:
  - when RLC has confirmed the successful transmission of the response message:
    - re-establish all AM and UM RLC entities with RB identities larger than ~~3~~ 4 and set the first 20 bits of all their HFN values to the START value included in the response message for the corresponding CN domain;
    - re-establish the RLC entities with RB identities ~~1 and 3~~1,3 and 4 and set the first 20 bits of all their HFN values to the START value included in the response message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
    - set the remaining bits of the HFN values of all AM and UM RLC entities with RB identities different from 2 to zero;
- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;
  - if the received reconfiguration message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;

- if the received reconfiguration message contained the IE "Ciphering mode info":

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received reconfiguration message contained the IE "Integrity protection mode info":

  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and

  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- clear the variable PDCP_SN_INFO;

- clear the variable START_VALUE_TO_TRANSMIT.

8.2.2.5 Reception of a response message by the UTRAN, normal case

When UTRAN has received

- the RADIO BEARER SETUP COMPLETE message; or
- the RADIO BEARER RECONFIGURATION COMPLETE message; or
- the RADIO BEARER RELEASE COMPLETE message; or
- the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message; or
- the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message;

UTRAN may:

- delete the old configuration.

If the procedure caused the UE to leave the CELL_FACH state, UTRAN may:

- delete the C-RNTI of the UE.

If the IE "UL Timing Advance" is included in TDD, UTRAN should:

- evaluate the timing advance value that the UE has to use in the new cell after handover.

If the IE "START" or the IE "START list " is included, UTRAN should:

- set the START value for each CN domain with the corresponding values as received in this response message;
- consequently, then use the START values to initialise the hyper frame numbers, in the same way as specified for the UE in subclause 8.2.2.3, for any new radio bearers that are established.

If UTRAN has ordered a ciphering reconfiguration by including the IE “Ciphering mode info” UTRAN should:

For radio bearers using RLC-AM or RLC-UM~~, UTRAN should~~:

- use the old ciphering configuration for received RLC PDUs with RLC sequence number less than the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
- use the new ciphering configuration for received RLC PDUs with RLC sequence number greater than or equal to the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" sent by the UE;
- if an RLC reset or re-establishment occurs after this response message has been received by UTRAN before the activation time for the new ciphering configuration has been reached:

- ignore the activation time; and
- apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

For radio bearers using RLC-TM:

- use the new ciphering configuration and only begin incrementing the COUNT-C at the CFN as indicated in:
  - the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info", if included in the message that triggered the radio bearer control procedure; or
  - the IE "COUNT-C activation time", if included in the response message for this procedure.

The procedure ends on the UTRAN side.

8.2.2.6 Unsupported configuration in the UE

If the UTRAN instructs the UE to use a configuration, which it does not support and/or if the received message causes the variable UNSUPPORTED_CONFIGURATION to be set to TRUE, the UE shall:

- transmit a failure response as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "configuration unsupported";
- set the variable UNSUPPORTED_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.7 Physical channel failure

A physical channel failure occurs in case the criteria defined in subclause 8.5.4 are not fulfilled.

If the received message caused the UE to be in CELL_DCH state and the UE failed to establish the dedicated physical channel(s) indicated in the received message the UE shall:

- revert to the configuration prior to the reception of the message (old configuration);
- if the old configuration includes dedicated physical channels (CELL_DCH state) and the UE is unable to revert to the old configuration:
  - select a suitable UTRA cell according to [4];
  - initiate a cell update procedure according to subclause 8.3.1, using the cause "radio link failure";
  - after the cell update procedure has completed successfully:
    - proceed as below;
- if the old configuration does not include dedicated physical channels (CELL_FACH state):
  - select a suitable UTRA cell according to [4];
  - if the UE selects another cell than the cell the UE camped on upon reception of the reconfiguration message:
    - initiate a cell update procedure according to subclause 8.3.1, using the cause "Cell reselection";
    - after the cell update procedure has completed successfully:

- proceed as below;

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to "physical channel failure";
- set the variable ORDERED_RECONFURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.8 Cell re-selection

If the UE performs cell re-selection during the reconfiguration procedure, the UE shall:

- initiate a cell update procedure, as specified in subclause 8.3.1;
- continue with the reconfiguration procedure.

8.2.2.9 Transmission of a response message by the UE, failure case

The UE shall:

- in case of reception of a RADIO BEARER SETUP message:
  - if the radio bearer establishment procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER SETUP FAILURE message;
  - transmit a RADIO BEARER SETUP FAILURE as response message on the DCCH using AM RLC;
- in case of reception of a RADIO BEARER RECONFIGURATION message:
  - if the radio bearer reconfiguration procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER RECONFIGURATION FAILURE message;
  - transmit a RADIO BEARER RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;
- in case of reception of a RADIO BEARER RELEASE message:
  - if the radio bearer release procedure affects several radio bearers:
    - (may) include the identities of the radio bearers for which the procedure would have been successful into the RADIO BEARER RELEASE FAILURE message;
  - transmit a RADIO BEARER RELEASE FAILURE as response message on the DCCH using AM RLC;

  in case of reception of a TRANSPORT CHANNEL RECONFIGURATION message:

  - transmit a TRANSPORT CHANNEL RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;

  in case of reception of a PHYSICAL CHANNEL RECONFIGURATION message:

- transmit a PHYSICAL CHANNEL RECONFIGURATION FAILURE as response message on the DCCH using AM RLC;

- when the response message has been submitted to lower layers for transmission:
  - continue with any ongoing processes and procedures as if no reconfiguration attempt had occurred.

8.2.2.10 Reception of a response message by the UTRAN, failure case

When the UTRAN has received

- the RADIO BEARER SETUP FAILURE message; or
- the RADIO BEARER RECONFIGURATION FAILURE message; or
- the RADIO BEARER RELEASE FAILURE message; or
- the TRANSPORT CHANNEL RECONFIGURATION FAILURE message; or
- the PHYSICAL CHANNEL RECONFIGURATION FAILURE message;

the UTRAN may restore the old and delete the new configuration. Upper layers should be notified of the failure.

The procedure ends on the UTRAN side.

8.2.2.11 Invalid configuration

If the variable INVALID_CONFIGURATION is set to TRUE the UE shall:

- keep the configuration existing before the reception of the message;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
    - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
    - clear that entry;
  - set the IE "failure cause" to "invalid configuration";
- set the variable INVALID_CONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.12 Incompatible simultaneous reconfiguration

If the table "Rejected transactions" in the variable TRANSACTIONS is set due to the received message and the variable PROTOCOL_ERROR_REJECT is set to FALSE, the UE shall:

- not apply the configuration contained in the received reconfiguration message;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Rejected transactions" in the variable TRANSACTIONS; and
  - clear that entry;

- set the IE "failure cause" to "incompatible simultaneous reconfiguration";

- continue with any ongoing processes and procedures as if the reconfiguration message was not received;

The procedure ends.

8.2.2.12a Incompatible simultaneous security reconfiguration

If the variable INCOMPATIBLE_SECURITY_RECONFIGURATION is set to TRUE due to the received reconfiguration message, the UE shall:

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "incompatible simultaneous reconfiguration";
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to FALSE;
- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.12b Cell update procedure during security reconfiguration

If:

- a cell update procedure according to subclause 8.3.1 is initiated; and
- the received reconfiguration message causes either,
  - the IE "Reconfiguration" in the variable CIPHERING_STATUS to be set to TRUE; and/or
  - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to be set to TRUE;

the UE shall:

- abort the ongoing integrity and/or ciphering reconfiguration;
- resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "cell update occurred";
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the received reconfiguration message contained the IE "Integrity protection mode info":

- set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
- clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- continue with any ongoing processes and procedures as if the reconfiguration message was not received.

The procedure ends.

8.2.2.13 Invalid received message

If the received reconfiguration message contains a protocol error causing the variable PROTOCOL_ERROR_REJECT to be set to TRUE according to clause 9, the UE shall perform procedure specific error handling as follows. The UE shall:

- transmit a failure response message as specified in subclause 8.2.2.9, setting the information elements as specified below:
  - include the IE "RRC transaction identifier"; and
  - set it to the value of "RRC transaction identifier" in the entry for the received message in the table "Rejected transactions" in the variable TRANSACTIONS; and
  - clear that entry;
  - set the IE "failure cause" to the cause value "protocol error";
  - include the IE "Protocol error information" with contents set to the value of the variable PROTOCOL_ERROR_INFORMATION.

The procedure ends.

8.3.1.5 Reception of an CELL UPDATE/URA UPDATE message by the UTRAN

When the UTRAN receives a CELL UPDATE/URA UPDATE message, it may either:

- in case the procedure was triggered by reception of a CELL UPDATE:
  - update the START value for each CN domain as maintained in UTRAN (refer to subclause 8.5.9) with "START" in the IE "START list" for the CN domain as indicated by "CN domain identity" in the IE "START list";
  - if this procedure was triggered while the UE was not in CELL_DCH state, then for each CN domain as indicated by "CN domain identity" in the IE "START list":
    - set the 20 MSB of the MAC-d HFN with the corresponding START value in the IE "START list";
    - set the remaining LSB of the MAC-d HFN to zero;
  - transmit a CELL UPDATE CONFIRM message on the downlink DCCH or optionally on the CCCH but only if ciphering is not required; and
  - optionally include the IE "RLC re-establish indicator" to request a RLC re-establishment in the UE, in which case the corresponding RLC entities should also be re-established in UTRAN; or
- in case the procedure was triggered by reception of a URA UPDATE:
  - transmit a URA UPDATE CONFIRM message to the lower layers for transmission on the downlink CCCH or DCCH in which case the UTRAN should include the IE "URA identity" in the URA UPDATE CONFIRM message in a cell where multiple URA identifiers are broadcast; or
- initiate an RRC connection release procedure (see subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH. In particular UTRAN should:
  - if the CELL UPDATE message was sent because of an unrecoverable error in RB2, RB3 or RB4:

- initiate an RRC connection release procedure (subclause 8.1.4) by transmitting an RRC CONNECTION RELEASE message on the downlink CCCH.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
    - for radio bearers with RB identity larger than 4:
      - re-establish the AM RLC entities;

- if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
  - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;

- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

- ~~if a~~ for each CN domain for which a transparent mode radio bearer ~~or signalling radio bearer~~ exists and for ~~the corresponding CN domain~~ which the IE "Status" in the variable CIPHERING_STATUS is set to "Started" ~~the UE shall~~ for that CN domain:
  - choose an activation time for the ciphering on transparent mode radio bearers and include it in the response message in the IE "COUNT-C activation time";
  - ~~for each CN domain in which a transparent mode radio bearer or signalling radio bearer exists:~~
    - ~~stop incrementing the COUNT-C value for the DPCH of that CN domain;~~
  - set the 20 MSB of the MAC-d HFN with the corresponding START value in the most recently sent IE "START list";
  - set the remaining LSB of the MAC-d HFN to zero;
  - apply ciphering on ~~that~~ the transparent mode radio bearers;
  - start incrementing the COUNT-C value from the CFN that has been included in the IE "COUNT-C activation time";

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:

- use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
        - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
        - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
        - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
        - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a URA update procedure:
    - stop the URA update procedure; and
    - continue with a cell update procedure;
  - set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
  - submit the CELL UPDATE message for transmission on the uplink CCCH;
  - increment counter V302;
  - restart timer T302 when the MAC layer indicates success or failure to transmit the message;
- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;

- indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
- and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include ~~and set~~ the IE "~~Integrity~~ Uplink integrity protection activation info" in any response message transmitted below and set this IE to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;

- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.

8.3.3.3 Reception of UTRAN MOBILITY INFORMATION message by the UE

When the UE receives a UTRAN MOBILITY INFORMATION message, it shall:

- act on received information elements as specified in subclause 8.6;
- if the IE "UE Timers and constants in connected mode" is present:
  - store the values of the IE "UE Timers and constants in connected mode" in the variable TIMERS_AND_CONSTANTS, replacing any previously stored value for each timer and constant; and
  - for each updated timer value:
    - start using the new value next time the timer is started;
  - for each updated constant value:
    - start using the new value directly;

- set the IE "RRC transaction identifier" in the UTRAN MOBILITY INFORMATION CONFIRM message to the value of "RRC transaction identifier" in the entry for the UTRAN MOBILITY INFORMATION message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the UTRAN MOBILITY INFORMATION CONFIRM message and set it to the value of the variable PDCP_SN_INFO;
- if the received UTRAN MOBILITY INFORMATION message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the UTRAN MOBILITY INFORMATION CONFIRM message;
- transmit a UTRAN MOBILITY INFORMATION CONFIRM message on the uplink DCCH using AM RLC;
- if the IE "Integrity protection mode info" was present in the UTRAN MOBILITY INFORMATION message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted UTRAN MOBILITY INFORMATION CONFIRM message;
- if the variable PDCP_SN_INFO is empty; and
  - if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
  - if the UTRAN MOBILITY INFORMATION message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the UTRAN MOBILITY INFORMATION CONFIRM message, perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the UTRAN MOBILITY INFORMATION CONFIRM message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the UTRAN MOBILITY INFORMATION message contained the IE "Ciphering mode info":

  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;

  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and

- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the UTRAN MOBILITY INFORMATION message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

The procedure ends.

8.3.4.3 Reception of an ACTIVE SET UPDATE message by the UE

Upon reception of an ACTIVE SET UPDATE message the UE shall act upon all received information elements as specified in 8.6, unless specified otherwise in the following. The UE shall:

- first add the RLs indicated in the IE "Radio Link Addition Information";
- remove the RLs indicated in the IE "Radio Link Removal Information". If the UE active set is full or becomes full, an RL, which is included in the IE "Radio Link Removal Information" for removal, shall be removed before adding RL, which is included in the IE "Radio Link Addition Information" for addition;
- perform the physical layer synchronisation procedure as specified in [29];
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "~~Integrity~~ Uplink integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in the ACTIVE SET UPDATE COMPLETE message; and
  - set it to the value of the variable PDCP_SN_INFO;
- if the IE "TFCI combining indicator" associated with a radio link to be added is set to TRUE:
  - if a DSCH transport channel is assigned and there is a 'hard' split in the TFCI field:
    - configure Layer 1 to soft-combine TFCI (field 2) of this new link with those links already in the TFCI (field 2) combining set;
- if the received ACTIVE SET UPDATE message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in the ACTIVE SET UPDATE COMPLETE message;
- set the IE "RRC transaction identifier" in the ACTIVE SET UPDATE COMPLETE message to the value of "RRC transaction identifier" in the entry for the ACTIVE SET UPDATE message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;
- if the IE "Integrity protection mode info" was present in the ACTIVE SET UPDATE message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted ACTIVE SET UPDATE COMPLETE message;

- if the variable PDCP_SN_INFO is empty:
  - if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
  - if the ACTIVE SET UPDATE message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the ACTIVE SET UPDATE COMPLETE message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the ACTIVE SET UPDATE COMPLETE message:
    - for each radio bearer in the variable PDCP_SN_INFO:
      - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
        - configure the RLC entity for that radio bearer to "continue";
    - clear the variable PDCP_SN_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Ciphering mode info":
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the ACTIVE SET UPDATE message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- the procedure ends on the UE side.

8.3.6.3 Reception of HANDOVER TO UTRAN COMMAND message by the UE

The UE shall be able to receive a HANDOVER TO UTRAN COMMAND message and perform an inter-RAT handover, even if no prior UE measurements have been performed on the target UTRAN cell and/or frequency.

The UE shall act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following. The UE shall:

- store a U-RNTI value (32 bits), which is derived by the IEs "SRNC identity" (12 bits) and "S-RNTI 2" (10 bits) included in IE "U-RNTI-short". In order to produce a full size U-RNTI value, a full size "S-RNTI" (20 bits) shall be derived by padding the IE "S-RNTI 2" with 10 zero bits in the most significant positions; and
- initialise the variable ESTABLISHED_SIGNALLING_CONNECTIONS with the signalling connections that remains after the handover according to the specifications of the source RAT;
- initialise the variable UE_CAPABILITIES_TRANSFERRED with the UE capabilities that have been transferred to the network up to the point prior to the handover, if any;
- initialise the variable TIMERS_AND_CONSTANTS to the default values and start to use those timer and constants values;
- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Predefined configuration":

- initiate the radio bearer and transport channel configuration in accordance with the predefined parameters identified by the IE "Predefined configuration identity";
- initiate the physical channels in accordance with the predefined parameters identified by the IE "Predefined radio configuration identity" and the received physical channel information elements;
- store information about the established radio access bearers and radio bearers according to the IE "Predefined configuration identity"; and
- set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration" and IE "Preconfiguration mode" is set to "Default configuration":
  - initiate the radio bearer and transport channel configuration in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity";
  - initiate the physical channels in accordance with the default parameters identified by the IE "Default configuration mode" and IE "Default configuration identity" and the received physical channel information elements;

  NOTE IE "Default configuration mode" specifies whether the FDD or TDD version of the default configuration shall be used

  - set the IE "RAB Info Post" in the variable ESTABLISHED_RABS and the IE "Re-establishment timer" in the IE "RAB Info" in the variable ESTABLISHED_RABS to "useT314";

- if IE "Specification mode" is set to "Preconfiguration":
  - use the following values for parameters that are neither signalled within the HANDOVER TO UTRAN COMPLETE message nor included within pre-defined or default configuration:
    - 0 dB for the power offset $P_{Pilot\text{-}DPDCH}$ bearer in FDD;
    - calculate the Default DPCH Offset Value using the following formula:
      - in FDD:

        Default DPCH Offset Value = (SRNTI 2 mod 600) * 512

      - in TDD:

        Default DPCH Offset Value = (SRNTI 2 mod 7)

    - handle the above Default DPCH Offset Value as if an IE with that value was included in the message, as specified in subclause 8.6.6.21;

- if IE "Specification mode" is set to "Complete specification":
  - initiate the radio bearer, transport channel and physical channel configuration in accordance with the received radio bearer, transport channel and physical channel information elements;

- perform an open loop estimation to determine the UL transmission power according to subclause 8.5.3;
- if ciphering has been activated and ongoing in the radio access technology from which inter- RAT handover is performed:
  - for the CN domain as in the IE "CN domain identity" which is included in the IE "RAB info" of the IE "RAB information to setup":
    - set the HFN component of the COUNT-C variable for all UL and DL radio bearers and all UL and DL signalling radio bearers that use RLC-AM and RLC-UM to the START value as stored in the USIM for that CN domain; and
    - set the remaining LSBs of the HFN component of COUNT-C to zero;

- set the HFN component of the COUNT-C variable for all UL and DL radio bearers and all UL and DL signalling radio bearers that use the transparent mode of RLC to zero, while not incrementing the value of the HFN component of the COUNT-C variable at each CFN cycle; and
- set the CFN component of the COUNT-C variable to the value of the CFN as calculated in subclause 8.5.15;
- set the IE "Status" in the variable CIPHERING_STATUS to "Started";
- apply the same ciphering status (ciphered/unciphered~~, algorithm~~) as prior to inter-RAT handover

~~-~~ if the~~, unless a~~ change of algorithm is requested by means of the IE "Ciphering algorithm";

-

- apply this algorithm and apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;

~~- apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

~~- if the IE "Ciphering algorithm" is not included then apply the same ciphering algorithm as prior to inter-RAT handover immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

~~- apply ciphering immediately upon reception of the HANDOVER TO UTRAN COMMAND;~~

If the UE succeeds in establishing the connection to UTRAN, it shall:

- if the IE "Status" in the variable CIPHERING_STATUS of a CN domain is set to "Started" and transparent mode radio bearers have been established by this procedure for that CN domain:
  - include the IE "COUNT-C activation time" in the response message and specify a CFN value other than the default, "Now" for this IE;
  - at the CFN value as indicated in the response message in the IE "COUNT-C activation time":
    - set the HFN component of the COUNT-C variable to the START value as indicated in the IE "START list" of the response message for the relevant CN domain; and
    - set the remaining LSBs of the HFN component of COUNT-C to zero;
    - increment the HFN component of the COUNT-C variable by one;
    - set the CFN component of the COUNT-C to the value of the IE "COUNT-C activation time" of the response message. The HFN component and the CFN component completely initialise the COUNT-C variable;
    - step the COUNT-C variable, as normal, at each CFN value. The HFN component is no longer fixed in value but incremented at each CFN cycle;
- transmit a HANDOVER TO UTRAN COMPLETE message on the uplink DCCH, using the new ciphering configuration, only if ciphering has been started;
- when the HANDOVER TO UTRAN COMPLETE message has been submitted to lower layers for transmission:
  - initialise variables upon entering UTRA RRC connected mode as specified in subclause 13.4;
- and the procedure ends.

8.5.2 Actions when entering idle mode from connected mode

When entering idle mode from connected mode, the UE shall:

- clear or set variables upon leaving UTRA RRC connected mode as specified in subclause 13.4;
- attempt to select a suitable cell to camp on.

When leaving connected mode according to [4], the UE shall:

- perform cell selection.

While camping on a cell, the UE shall:

- acquire system information according to the system information procedure in subclause 8.1;
- perform measurements according to the measurement control procedure specified in subclause 8.4; and
- if the UE is registered:
  - be prepared to receive paging messages according to the paging procedure in subclause 8.2.

If IE "PLMN identity" within variable SELECTED_PLMN has the value "GSM-MAP", the UE shall:

- delete any NAS system information received in connected mode;
- acquire the NAS system information in system information block type 1; and
- proceed according to subclause 8.6.1.2.

When entering idle mode, the UE shall:

- if the USIM is present:
  - store the current START value for every CN domain in the USIM [50];
  - if the "START" stored in the USIM [50] for a CN domain is greater than the value "THRESHOLD" of the variable START_THRESHOLD:
    - delete the ciphering and integrity keys that are stored in the USIM for that CN domain;
    - set the value of START value to THRESHOLD;
    - inform the deletion of these keys to upper layers.

8.5.8 Maintenance of Hyper Frame Numbers

The MSBs of both the ciphering sequence numbers (COUNT-C) and integrity sequence numbers (COUNT-I), for the ciphering and integrity protection algorithms, respectively [40], are called the Hyper Frame Numbers (HFN).

For integrity protection, the UE shall:

- maintain COUNT-I as specified in subclause 8.5.10.

The following hyper frame numbers types are defined:

MAC-d HFN:
24 MSB of COUNT-C for data sent over RLC TM

RLC UM HFN:
25 MSB of COUNT-C for data sent over RLC UM

RLC AM HFN:
20 MSB of COUNT-C for data sent over RLC AM

RRC HFN:
28 MSB of COUNT-I

For non-transparent mode RLC signalling radio bearers and radio bearers, the UE shall:

- maintain one uplink and one downlink COUNT-C per signalling radio bearer and per radio bearer and one uplink and one downlink COUNT-I per signalling radio bearer.

For all transparent mode RLC signalling radio bearers and radio bearers of each CN domain, the UE shall:

- maintain one COUNT-C, common for all signalling radio bearers and radio bearers in uplink and downlink;
- maintain one uplink and one downlink COUNT-I per signalling radio bearer.

NOTE: In this release of the specification there is only an uplink transparent mode COUNT-I, which is used for signalling radio bearer RB0.

COUNT-C and COUNT-I are defined in [40], with the following supplement for COUNT-C: for transparent mode RLC radio bearers with a transmission time interval of x radio frames (x = 2, 4, 8), the MAC PDU is carried by L1 in x consecutive radio frames due to radio frame segmentation. In this case, the CFN of the first segment of the MAC PDU is used as the CFN component of COUNT-C.

8.5.9 START value calculation

~~The START value calculation, or locally stored START value maintained in both the UE and UTRAN is generally performed for CN domain [40]:~~

- ~~whenever a START value is required to initialise the HFN components of COUNT-C and COUNT-I;~~
- ~~whenever the 20 MSB of the COUNT-C and COUNT-I;~~

~~The START value calculation maintains the value equal to the highest currently used HFN + 1 for each CN domain. The START value calculation shall be calculated in UE and UTRAN as specified below:~~

[NOTE: All indentations are increased by one]

In connected mode, the START value for CN domain 'X' is calculated as:

Let $START_X$ = the START value for CN domain 'X' prior to the calculation below:

$START_X'$ = MSB_{20} (MAX {COUNT-C, COUNT-I | radio bearers and signalling radio bearers ~~with~~ using the most recently configured CK_X and IK_X}) + 1.

- if $START_X'$= the maximum value = 1048575 then $START_X$ = $START_X'$;
- if the current $START_X$ < $START_X'$ then $START_X$ = $START_X'$, otherwise $START_X$ is unchanged.

NOTE: Here, “most recently configured” means that if there are more than one key in use for a CN domain, due to non expiry of the ciphering and/or integrity protection activation time for any signalling radio bearers and/or radio bearers, do not include the COUNT-I/COUNT-C for these signalling radio bearers and/or radio bearers in the calculation of the $START_X'$.

8.5.10 Integrity protection

If the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" then the UE ~~and UTRAN~~ shall ~~(and UTRAN should)~~:

- perform integrity protection (and integrity checking) on all RRC messages, with the following exceptions:

  HANDOVER TO UTRAN COMPLETE

  PAGING TYPE 1

  PUSCH CAPACITY REQUEST

  PHYSICAL SHARED CHANNEL ALLOCATION

  RRC CONNECTION REQUEST

  RRC CONNECTION SETUP

  RRC CONNECTION SETUP COMPLETE

  RRC CONNECTION REJECT

  RRC CONNECTION RELEASE (CCCH only)

SYSTEM INFORMATION

SYSTEM INFORMATION CHANGE INDICATION

TRANSPORT FORMAT COMBINATION CONTROL (TM DCCH only)

If the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Not started" then integrity protection (and integrity checking) shall not be performed on any RRC message.

For each signalling radio bearer, the UE shall use two RRC hyper frame numbers:

- "Uplink RRC HFN";
- "Downlink RRC HFN".

and two message sequence numbers:

- "Uplink RRC Message sequence number";
- "Downlink RRC Message sequence number".

The above information is stored in the variable INTEGRITY_PROTECTION_INFO per signalling radio bearer (RB0-RB4).

Upon the first activation of integrity protection for an RRC connection, UE and UTRAN initialise the "Uplink RRC Message sequence number" and "Downlink RRC Message sequence number" for all signalling radio bearers as specified in subclauses 8.6.3.5 and 8.5.10.1.

~~As a general rule, the~~The RRC message sequence number (RRC SN) is incremented for every integrity protected RRC message. ~~In cases when there are exceptions, these are stated for those procedures.~~

8.5.10.1 Integrity protection in downlink

If the UE receives an RRC message on signalling radio bearer with RB identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is present the UE shall:

~~- perform the actions in subclause 8.6.3.5; and~~

~~- apply the new integrity protection configuration;~~

- check the value of the IE "RRC message sequence number" included in the IE "Integrity check info";
  - if the "Downlink RRC Message sequence number" is not present in the variable INTEGRITY_PROTECTION_INFO:
    - initialise the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received message;
  - if the "Downlink RRC Message sequence number" is present in the variable INTEGRITY_PROTECTION_INFO:
    - if the RRC message sequence number is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO:
      - increment "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with one;
    - if the RRC message sequence number is equal to the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO:
      - discard the message;
- calculate an expected message authentication code in accordance with subclause 8.5.10.3;
- compare the expected message authentication code with the value of the received IE "message authentication code" contained in the IE "Integrity check info";

- if the expected message authentication code and the received message authentication code are the same, the integrity check is successful:
  - update the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with the value of the IE "RRC message sequence number" included in the IE "Integrity check info" of the received RRC message;
- if the calculated expected message authentication code and the received message authentication code differ:
  - if the IE "RRC message sequence number" included in the IE "Integrity check info" is lower than the "Downlink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO (in this case the "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO was incremented by one, as stated above):
    - decrement "Downlink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO by one;
  - discard the message.

If the UE receives an RRC message on signalling radio bearer with identity n, the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" and the IE 'Integrity check info' is not present the UE shall:

- discard the message.

8.5.10.2 Integrity protection in uplink

~~Upon transmitting an~~ Prior to sending an RRC message using the signalling radio bearer with radio bearer identity n, and the "Status" in the variable INTEGRITY_ PROTECTION_INFO has the value "Started" the UE shall:

- increment "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with 1. When "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO becomes 0, the UE shall increment "Uplink RRC HFN" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO with 1;
- calculate the message authentication code in accordance with subclause 8.5.10.3;
- replace the "Message authentication code" in the IE "Integrity check info" in the message with the calculated message authentication code~~.~~;
- replace the "RRC Message sequence number" in the IE "Integrity check info" in the message with contents set to the new value of the "Uplink RRC Message sequence number" for signalling radio bearer RBn in the variable INTEGRITY_PROTECTION_INFO;

~~During an ongoing reconfiguration of the integrity protection, UTRAN should, for all signalling radio bearers, apply the old configuration (that is, the configuration that was applied before the reconfiguration) for the integrity protection.~~ In the response message for the procedure ordering the security reconfiguration, the UE indicates the activation time, for each signalling radio bearer except ~~RB2~~for the signalling radio bearer that was used for this security reconfiguration procedure~~, w~~. When the new integrity configuration is to be applied in uplink~~.~~, UTRAN should then start to apply the new integrity protection configuration according to the activation time for each signalling radio bearer (except for the signalling radio bearer ~~RB2~~ which is used to send the message that is reconfiguring the security configuration) where the new configuration is to be applied starting from and including reception of the response message~~)~~.

8.5.10.3 Calculation of message authentication code

The UE shall calculate the message authentication code in accordance with [40]. The input parameter MESSAGE [40] for the integrity algorithm shall be constructed by:

- setting the "Message authentication code" in the IE "Integrity check info" in the message to the radio bearer identity for the signalling radio bearer;
- setting the "RRC Message sequence number" in the IE "Integrity check info" in the message to zero;
- encoding the message;
- appending RRC padding (if any) as a bit string to the encoded bit string as the least significant bits.

For usage on an RRC message transmitted or received on the radio bearer with identity n, the UE shall:

- construct the input parameter COUNT-I [40] by appending the following IEs from the IE "Signalling radio bearer specific integrity protection information" for radio bearer n in the variable INTEGRITY_PROTECTION_INFO:
  - for uplink:
    - "Uplink RRC HFN", as the MSB, and "Uplink RRC Message sequence number", as LSB;
  - for downlink:
    - "Downlink RRC HFN", as the MSB, and the IE "RRC message sequence number" included in the IE "Integrity check info", as LSB.

8.6.3.4 Ciphering mode info

The IE "Ciphering mode info" defines the new ciphering configuration. At any given time, the UE needs to store at most two different ciphering configurations at any given time for all signalling radio bearers and radio bearers, the old and latest ciphering configurations, per CN domain.

[NOTE: Created a paragraph here. Also the indentation has changed in SOME places]

~~If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration and therefore shall not follow any of the actions as specified (in this subclause) below.~~

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration"~~for any CN domain~~ in the variable CIPHERING_STATUS~~,~~ ~~the IE "Reconfiguration" in the variable CIPHERING_STATUS~~is set to TRUE, the UE shall:

- ignore this second attempt to change the ciphering configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall:~~If for all CN domains in the variable CIPHERING_STATUS, the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall~~: ~~check the IE "Ciphering mode command" as part of the IE "Ciphering mode info", and perform the following. The UE shall:~~

- ~~if the IE "Status" in the variable CIPHERING_STATUS of the CN domain~~
  - ~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~
  - ~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~

  ~~has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop":~~
  - ~~ignore this attempt to change the ciphering configuration; and~~
  - ~~set the variable INVALID_CONFIGURATION to TRUE;~~
- if the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN has the value "Not Started", and if the IE "Ciphering mode command" has the value "stop"; or
- if the IE "Status" in the variable “CIPHERING STATUS has the value "Not started", and this IE was included in a message that is not the message SECURITY MODE COMMAND~~:~~; or
- if there does not exist exactly one ciphering activation time in the IE “Radio bearer downlink ciphering activation time info” for each established RLC-AM and RLC-UM radio bearers included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN; or

- if there does not exist exactly one ciphering activation time in the IE “Ciphering activation time for DPCH” for each established RLC-TM radio bearers included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN; or

- if there does not exist exactly one ciphering activation time in the IE “Radio bearer downlink ciphering activation time info” for each established signalling radio bearer included in the IE “Signalling radio bearer information” in the IE “ESTABLISHED_RABS” ~~for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~

~~if this procedure changes the ciphering configuration for RBs of a CN domain for which the IE "Status" in the variable CIPHERING_STATUS is "Not Started":~~

- ignore this attempt to change the ciphering configuration;

- set the variable INVALID_CONFIGURATION to TRUE;

- perform the actions as specified in subclause 8.1.12.4c;

~~exit this subclause and go to the subclause on handling of invalid configurations for this procedure;~~

~~else:~~

If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to FALSE, the UE shall: ~~If for all CN domains in the variable CIPHERING_STATUS, the IE "Reconfiguration" is set to FALSE, then for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, the UE shall:~~

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to TRUE;
- if IE "Ciphering mode command" has the value "start/restart":

~~start or restart ciphering in lower layers for all established radio bearers in the variable ESTABLISHED_RABS, using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration. For each radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER in the ciphering algorithm. The new ciphering configuration shall be applied as specified below;~~

- set the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain

~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~as indicated in the IE "CN domain identity" in the message, if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~

~~-~~ to "Started";

- start or restart the new ciphering configuration in the lower layers:

- ~~if for all established radio bearers that are included in the IE “RB information” in the IE “ESTABLISHED_RABS” for the CN domain as indicated in the:~~

~~variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~in the IE "CN domain identity" of the message, if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised;~~

~~there exists an associated ciphering activation time for exactly each radio bearer above in the IE “Radio bearer downlink ciphering activation time info”;~~

~~else;~~

~~set the variable INVALID_CONFIGURATION to TRUE;~~

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

- exit this subclause and go to the subclause on handling of invalid configurations for this procedure;

NOTE: The IE "Ciphering mode info" shall indicate ciphering activation times for exactly all established radio bearers for the relevant CN domain on which the security reconfiguration is being performed.

- if for all signalling radio bearers that are included in the IE "Signalling radio bearer information " in the IE "ESTABLISHED_RABS" there exists an associated ciphering activation time for exactly each signalling radio bearer above in the IE "Radio bearer downlink ciphering activation time info";

- else:

- set the variable INVALID_CONFIGURATION to TRUE;

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE;

- exit this subclause and go to the subclause on handling of invalid configurations for this procedure;

NOTE: The IE "Ciphering mode info" shall indicate ciphering activation times for exactly all established signalling radio bearers.

- using the ciphering algorithm (UEA [40]) indicated by the IE "Ciphering algorithm" as part of the new ciphering configuration;

- for each radio bearer and signalling radio bearer, the value of the IE "RB identity" in the variable ESTABLISHED_RABS minus one shall be used as the value of BEARER [40] in the ciphering algorithm;

- start incrementing the COUNT-C values for all RLC-AM and RLC-UM signalling radio bearers or and continue incrementing the COUNT-C values for all RLC-AM and RLC-UM radio bearers and all RLC-AM and RLC-UM signalling radio bearers;

- if at least one transparent mode radio bearer already exists prior to this procedure and at least one transparent mode radio bearer will exist after this procedure for a this CN domain; and d

- ciphering was started for the this CN domain prior to this procedure; and

- the UE was prior to this procedure in CELL_DCH and will be in CELL_DCH after this procedure:

- continue incrementing the COUNT-C value for that this CN domain;

- else:

- if the UE was in CELL_FACH before this procedure and will be in CELL_DCH after this procedure, and there will be a transparent mode radio bearer or signalling radio bearer [EU51]after the completion of this procedure for a this CN domain:; or

- if the UE was in CELL_DCH before this procedure and will be in CELL_DCH after this procedure and there was no transparent mode radio bearer or signalling radio bearer [EU52]for a this CN domain and there will be a transparent mode radio bearer or signalling radio bearer for that this CN domain after the completion of this procedure and the IE "Ciphering activation time for DPCH" was included in this IE , the UE shall:

- start incrementing the COUNT-C values for that CN domain at the ciphering activation time as specified in the procedure:;

NOTE: If the ciphering activation time for transparent mode radio bearers was specified in the downlink then the IE "Ciphering activation time for DPCH" is included (eg for the SECURITY MODE COMMAND), otherwise, this ciphering activation time is specified in the IE "COUNT-C activation time" in the uplink response message.

- if the IE "Ciphering mode command" has the value "stop", the UE shall:

- when the new ciphering configuration is applied at the time as specified below:
  - stop ciphering for all radio bearers for this CN domain and all signalling radio bearers;
  - stop incrementing COUNT-C values for all UL and DL signalling radio bearers and also for UL and DL radio bearers using RLC-TM;
  - continue incrementing COUNT-C values for all UL and DL radio bearers using RLC-UM or RLC-AM.
  - ~~stop incrementing COUNT-C values for all UL and DL radio bearers and also for UL and DL signalling radio bearers using RLC-TM;~~
  - ~~continue incrementing COUNT-C values for all UL and DL radio bearers and for all UL and DL signalling radio bearers using RLC-UM or RLC-AM;~~
  - ~~stop ciphering and stop incrementing COUNT-C values for all UL and DL signalling radio bearers and also for UL and DL transparent RLC mode radio bearers, only at the new ciphering configuration that shall be applied as specified below;~~
- set the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN to “Not started”;
  - ~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~
  - ~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN is not initialised~~
  - ~~to "Not started";~~

- in case the IE "Ciphering mode command" has the value "start/restart" or "stop", the new ciphering configuration shall be applied as follows:
  - store the (oldest currently used) ciphering configuration until activation times have elapsed for the new ciphering configuration to be applied on all signalling radio bearers and radio bearers;
  - if there are pending activation times set for ciphering by a previous procedure changing the ciphering configuration:
    - apply the ciphering configuration at this pending activation time ~~as indicated in this procedure~~;
  - if the IE "Ciphering activation time for DPCH" is present in the IE "Ciphering mode info" and the UE was in CELL_DCH state prior to this procedure:
    - for radio bearers using RLC-TM:
      - apply the old ciphering configuration for CFN less than the number indicated in the IE "Ciphering activation time for DPCH";
      - apply the new ciphering configuration for CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH";
      - ~~apply the new configuration at that time for radio bearers using RLC-TM. If the IE "Ciphering mode info" is present in a message reconfiguring RB, transport channel or physical channel, the indicated time in IE "Activation time for DPCH" corresponds to a CFN after that reconfiguration;~~
  - if the UE was in CELL_FACH state prior to this procedure and at completion of this procedure a transparent mode radio bearer exists and the IE "Ciphering activation time for DPCH" is not present in the IE "Ciphering mode info":
    - for radio bearers using RLC-TM:
      - apply the old ciphering configuration for CFN less than the number as indicated in the transmitted uplink response message for the ciphering activation time for this radio bearer;

    ~~NOTE: This shall be indicated by the IE “COUNT-C activation time” in the transmitted uplink response message.~~

- apply the new ciphering configuration for CFN greater than or equal to the number as indicated in the transmitted uplink response message for the ciphering activation time for this radio bearer;

NOTE: This ~~shall be~~ is indicated by the IE "COUNT-C activation time" in the transmitted uplink response message.

- if the IE "Radio bearer downlink ciphering activation time info" is present~~: in the IE "Ciphering mode info":~~
  - apply the following procedure for each radio bearer and signalling radio bearers using RLC-AM ~~and~~ or RLC-UM indicated by the IE "RB identity":
    - suspend ~~data~~ uplink transmission on the radio bearer ~~and or~~or the signalling radio bearer (except for that SRBm that the message was used)~~s~~;
    - select an "RLC send sequence number" at which (activation) time the new ciphering configuration shall be applied in uplink for that radio bearer according to the following:
      - for each radio bearer ~~and~~ and signalling radio bearer that has no pending ciphering activation time as set by a previous procedure changing the security configuration:
        - set a suitable value that would ensure a minimised delay in the change to the latest security configuration;
      - for each radio bearer ~~and~~ and signalling radio bearer that has a pending ciphering activation time as set by a previous procedure changing the security configuration:
        - set the same value as the pending ciphering activation time;
      - consider this activation time to be elapsed when the selected activation time (as above) is equal to the "RLC send sequence number";
    - store the selected "RLC send sequence number" for that radio bearer in the entry for the radio bearer in the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
    - when the data transmission of that radio bearer or signalling radio bearer is resumed switch to the new ciphering configuration according to the following:

      ~~switch to the new ciphering configuration according to the following:~~

      - use the old ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers smaller than the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;
      - use the new ciphering configuration for the transmitted and received RLC PDUs with RLC sequence numbers greater than or equal to the corresponding RLC sequence numbers indicated in the IE "Radio bearer uplink ciphering activation time info" sent to UTRAN and in the received IE "Radio bearer downlink ciphering activation time info" received from UTRAN, respectively;
      - for a radio bearer using RLC-AM, when the RLC sequence number indicated in the IE "Radio bearer downlink ciphering activation time info" falls below the RLC receiving window and the RLC sequence number indicated in the IE "Radio bearer uplink ciphering activation time info" falls below the RLC transmission window, the UE may release the old ciphering configuration for that radio bearer;
      - if an RLC reset or re-establishment occurs before the activation time for the new ciphering configuration has been reached, ignore the activation time and apply the new ciphering configuration immediately after the RLC reset or RLC re-establishment.

~~If the IE "Ciphering mode info" is present and if the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE, the UE shall:~~

- ~~ignore this second attempt to change the ciphering configuration; and~~
- ~~set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.~~

If the IE "Ciphering mode info" is not present, the UE shall not change the ciphering configuration.

8.6.3.5 Integrity protection mode info

The IE "Integrity protection mode info" defines the new integrity protection configuration. At any given time, the UE needs to store at most two different integrity protection configurations for all signalling radio bearers, the old and newest integrity protection configurations, per CN domain.

[NOTE: Created paragraph]

~~If the IE "Integrity protection mode info" is not present, t~~The UE shall not change the integrity protection configuration and therefore shall not follow any of the actions as specified (in this subclause) below.

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE, the UE shall:

- ignore this second attempt to change the integrity protection configuration; and
- set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.

If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_~~STATUS~~ INFO is set to FALSE, the UE shall: ~~check the IE "Integrity protection mode command" as part of the IE "Integrity protection mode info", and perform the following. The UE shall:~~

~~if the IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started":~~

~~ignore this attempt to change the integrity protection configuration; and~~

~~set the variable INVALID_CONFIGURATION to TRUE;~~

~~else:~~

Note: Indentation changed to throughout this section. Not all indentations have changed.

- set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_~~STATUS~~ INFO to TRUE;
- if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and this IE was included in the message SECURITY MODE COMMAND:

~~if the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO has the value "Never been active":~~

- initialise the information for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO according to the following:

~~initialise the 20 MSB of the "Uplink RRC HFN" and "Downlink RRC HFN" of COUNT-I for this signalling radio bearer with the START value included in the most recently transmitted IE "START list" for the CN domain:~~

~~as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN, if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised; or~~

~~as indicated in the IE "CN domain identity", if the variable LATEST_CONFIGURED_CN_DOMAIN has not been initialised;~~

~~set the remaining LSB of the "Uplink RRC HFN" and "Downlink RRC HFN" to zero;~~

- set the IE "Uplink RRC Message sequence number" in the ~~IE "~~variable INTEGRITY_PROTECTION_INFO~~"~~ to zero;
- do not include the IE "Downlink RRC Message sequence number" which is included in the ~~IE "~~variable INTEGRITY_PROTECTION_INFO~~"~~;

~~- set the IE "Historical status" in the variable INTEGRITY_PROTECTION_INFO to the value "Has been active";~~

- set the IE "Status" in the variable INTEGRITY_PROTECTION_INFO to the value "Started";
- perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
  - ~~use~~ using the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
  - ~~use~~ using the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];

- if IE "Integrity protection mode command" has the value "start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started" and this IE was not included SECURITY MODE COMMAND:

NOTE: This case is used in SRNS relocation

- perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
  - ~~use~~ using the algorithm (UIA [40]) indicated by the IE "Integrity protection algorithm" contained in the IE "Integrity protection mode info";
  - ~~use~~ using the IE "Integrity protection initialisation number", contained in the IE "Integrity protection mode info" as the value of FRESH [40];

- if IE "Integrity protection mode command" has the value "modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started" and this IE was included SECURITY MODE COMMAND:
  - store the (~~most recent of the~~ oldest currently used) integrity protection configuration until activation times have elapsed for the new integrity protection configuration to be applied on all signalling radio bearers;
  - if there are pending activation times set for integrity protection by a previous procedure changing the integrity protection configuration:
    - apply the integrity protection configuration at this pending activation time as indicated in this procedure;
  - start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each signalling radio bearer n, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info", included in the IE "Integrity protection mode info";
  - perform integrity protection on the received message, applying the new integrity protection configuration, as described in subclause 8.5.10.1;
    - if present, use the algorithm indicated by the IE "Integrity protection algorithm" (UIA [40]);

- let RBm be the signalling radio bearer on which the message containing the IE "integrity protection mode info" was received;

  - set the content of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO according to the following:
    - for each established signalling radio bearer, stored in the variable ESTABLISHED_RABS:
      - select a value of the RRC sequence number at which (activation) time the new integrity protection configuration shall be applied in uplink for that signalling radio bearer according to the following:
        - for each signalling radio bearer that has no pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration:

- set a suitable value that would ensure a minimised delay in the change to the latest integrity protection configuration;

- for signalling radio bearer that has a pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration:

  - set the same value as the pending activation time for integrity protection;

- consider this (pending) activation time to be elapsed when the selected activation time (as above) is equal to the next RRC sequence number to be used, which means that the last RRC message using the old integrity protection configuration has been submitted to lower layers;

- for signalling radio bearer RB0:

  - set the value of the included RRC sequence number to greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one;

- prohibit the transmission of RRC messages on all signalling radio bearers, except for RBm, with RRC SN greater than or equal to the value in the "RRC message sequence number list" for the signalling radio bearer in the IE "Uplink integrity protection activation info" of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

~~- let RBm be the signalling radio bearer on which the message containing the IE "integrity protection mode info" was received;~~

- start applying the new integrity protection configuration in the uplink at the RRC sequence number, for each RBn, except for signalling radio bearer RBm, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Uplink integrity protection activation info", included in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- start applying the new integrity protection configuration in the uplink at the RRC sequence number for signalling radio bearer RBm, as specified for the procedure initiating the integrity protection reconfiguration;

- start applying the new integrity protection configuration in the downlink at the RRC sequence number, for each RBn, except for signalling radio bearer RBm, indicated by the entry for signalling radio bearer n in the "RRC message sequence number list" in the IE "Downlink integrity protection activation info".

NOTE: For signalling radio bearers that have a pending activation time as set for integrity protection by a previous procedure changing the integrity protection configuration, UTRAN should set this value in IE "Downlink integrity protection activation info".

- start applying the new integrity protection configuration in the downlink at the RRC sequence number for signalling radio bearer RBm, as specified for the procedure initiating the integrity protection reconfiguration;

If IE "Integrity protection mode command" has the value "Start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and the IE "Integrity protection mode command info" was not included in the message SECURITY MODE COMMAND; or

If IE "Integrity protection mode command" has the value "Start" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not started", and the IE "Integrity protection mode ~~command~~info" was included in the message SECURITY MODE COMMAND, and the IE “Integrity protection algorithm” is not included; or

If the IE "Integrity protection mode ~~command~~command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Not Started"; or

If there does not exist exactly one integrity protection activation time in the IE “Downlink integrity protection activation info” for each established signalling radio bearer included in the IE “Signalling radio bearer information” in the IE “ESTABLISHED_RABS” ~~for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN~~; or

If IE "Integrity protection mode command" has the value "Modify" and the IE "Status" in the variable INTEGRITY_PROTECTION_INFO has the value "Started", and the IE "Integrity protection mode ~~command~~info" was not included in the message SECURITY MODE COMMAND:

- ignore this attempt to change the integrity protection configuration; and
- set the variable INVALID_CONFIGURATION to TRUE;

~~If the IE "Integrity protection mode info" is present and if the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_STATUS is set to TRUE, the UE shall:~~

- ~~ignore this second attempt to change the integrity protection configuration; and~~
- ~~set the variable INCOMPATIBLE_SECURITY_RECONFIGURATION to TRUE.~~

If the IE "Integrity protection mode info" is not present, the UE shall not change the integrity protection configuration.

8.6.4.1 Signalling RB information to setup list

If the IE "Signalling RB information to setup list" is included the UE shall:

- use the same START value to initialise the COUNT-C and COUNT-I variables for all the signalling radio bearers in the list;
- for each occurrence of the IE "Signalling RB information to setup":
  - use the value of the IE "RB identity" as the identity of the signalling radio bearer to setup;
  - if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised and the value "STATUS" of the variable "CIPHERING_STATUS" of the CN domain stored in this variable is "Started":
    - if the IE "Uplink RLC mode" or the IE "Downlink RLC mode" in the IE "RLC info" is set to "AM RLC" or "UM RLC":
      - initialise the 20 MSB of the hyper frame number component of COUNT-C for this signalling radio bearer with the START value for the CN domain as indicated in the variable "LATEST_CONFIGURED_CN_DOMAIN";
      - set the remaining LSB of the hyper frame number component of COUNT-C for this signalling radio bearer to zero;

    ~~if the IE "Uplink RLC mode" and/or the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":~~

    - ~~if no other transparent mode RLC radio bearers or signalling radio bearers in the variable "ESTABLISHED_RABS" exist:~~
      - ~~initialise the 20 MSB of the hyper frame number component of COUNT-C for this signalling radio bearer with the START value for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~
      - ~~set the remaining LSB of the hyper frame number component of COUNT-C for this signalling radio bearer to zero;~~
    - ~~if at least one transparent mode RLC radio bearers or signalling radio bearers in the variable "ESTABLISHED_RABS" exist:~~
      - ~~use, for this signalling radio bearer, the COUNT-C for transparent mode radio bearers and signalling radio bearers that is common (refer to subclause 8.5.8), for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;~~
  - if the variable LATEST_CONFIGURED_CN_DOMAIN has been initialised and the value "Status" of the variable "INTEGRITY_PROTECTION_INFO" of the CN domain stored in this variable is "Started":

- initialise the 20 MSB of the hyper frame number component of COUNT-I for this signalling radio bearer with the START value for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN;

- set the remaining LSB of the hyper frame number component of COUNT-I for this signalling radio bearer to zero;

- for this signalling radio bearer, set the IE "Uplink RRC Message sequence number" in the variable INTEGRITY_PROTECTION_INFO to zero;

- perform the actions for the IE "RLC info" as specified in subclause 8.6.4.9, applied for that signalling radio bearer;

- perform the actions for the IE "RB mapping info" as specified in subclause 8.6.4.8, applied for that signalling radio bearer;

- apply a default value of the IE "RB identity" equal to 1 for the first IE "Signalling RB information to setup"; and

- increase the default value by 1 for each occurrence.

8.6.4.2 RAB information for setup

If the IE "RAB information for setup" is included, the procedure is used to establish radio bearers belonging to a radio access bearer, and the UE shall:

- if several IEs "RAB information for setup" are included and the included IEs "CN domain identity" in the IE "RAB info" does not all have the same value:

  - set the variable INVALID_CONFIGURATION to TRUE;

- if the radio access bearer identified with the IE "RAB info" does not exist in the variable ESTABLISHED_RABS:

  - create a new entry for the radio access bearer in the variable ESTABLISHED_RABS;

  - store the content of the IE "RAB info" in the entry for the radio access bearer in the variable ESTABLISHED_RABS;

  - indicate the establishment of the radio access bearer to the upper layer entity using the IE "CN domain identity", forwarding the content of the IE "RAB identity";

  If prior to this procedure there exists no transparent mode radio bearer for the CN domain included in the IE "CN domain identity" and at least one transparent mode radio bearer is included in the the IE "RB information to setup"; or

  If at least one RLC-AM or RLC-UM radio bearer is included in the the IE "RB information to setup":

  - calculate the START value only once during this procedure (the same START value shall be used on all new radio bearers created for this radio access bearer) according to subclause 8.5.9 for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information to setup";

  - store the calculated START value in the variable START_VALUE_TO_TRANSMIT;

- for each radio bearer in the IE "RB information to setup":

  - if the radio bearer identified with the IE "RB identity" does not exist in the variable ESTABLISHED_RABS for another radio access bearer than the one identified with the IE "RAB info":

    - perform the actions specified in subclause 8.6.4.3;

    - store information about the new radio bearer in the entry for the radio access bearer identified by "RAB info" in the variable ESTABLISHED_RABS;

  - if the radio bearer identified with the IE "RB identity" does not exist in the variable ESTABLISHED_RABS for the radio access bearer identified with the IE "RAB info":

- create a new RAB subflow for the radio access bearer;
- number the RAB subflow in ascending order, assigning the smallest number to the RAB subflow corresponding to the first radio bearer in the list;
- if the IE "CN domain identity" in the IE "RAB info" is set to "PS domain" and the number of RAB subflows for the radio access bearer is greater than 1:
  - set the variable INVALID_CONFIGURATION to TRUE;

- if the radio bearer identified with the IE "RB identity" already exists in the variable ESTABLISHED_RABS for another radio access bearer than the one identified with the IE "RAB info":
  - set the variable INVALID_CONFIGURATION to TRUE.

8.6.4.2a RAB information to reconfigure

If the IE "RAB information to reconfigure" is included then the UE shall:

- if the entry for the radio access bearer identified by the IE "CN domain identity" together with the IE "RAB Identity" in the variable ESTABLISHED_RABS already exists:
  - perform the action for the IE "NAS Synchronization Indicator", according to subclause 8.6.4.12;
- else:
  - set the variable INVALID_CONFIGURATION to TRUE.

8.6.4.3 RB information to setup

If the IE "RB information to setup" is included, the UE shall apply the following actions on the radio bearer identified with the value of the IE "RB identity". The UE shall:

- use the same START value to initialise the hyper frame number components of COUNT-C ~~and COUNT-I~~ variables for all the new ~~UL and DL~~ UL and DL radio bearers to setup;
- perform the actions for the IE "PDCP info", if present, according to subclause 8.6.4.10, applied for the radio bearer;
- perform the actions for the IE "RLC info", according to subclause 8.6.4.9, applied for the radio bearer;
- perform the actions for the IE "RB mapping info", according to subclause 8.6.4.8, applied for the radio bearer;
- if the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":
  - configure delivery of erroneous SDUs in lower layers according to indication from upper layer [5].
- if the IE "Uplink RLC mode" or the IE "Downlink RLC mode" in the IE "RLC info" is set to "AM RLC" or "UM RLC":
  - initialise the 20 MSB of the hyper frame number component of COUNT-C for this radio bearer with the START value in the variable START_VALUE_TO_TRANSMIT ~~for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup"~~;
  - set the remaining LSB of the hyper frame number component of COUNT-C for this radio bearer to zero;

  - start incrementing the COUNT-C values;
- if the IE "Uplink RLC mode" and the IE "Downlink RLC mode" in the IE "RLC info" is set to "TM RLC":
  - if no other transparent mode RLC radio bearers and signalling radio bearers exist in the variable ESTABLISHED_RABS:
    - initialise the 20 MSB of the hyper frame number component of COUNT-C for this radio bearer with the START value ~~for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup~~in the variable START_VALUE_TO_TRANSMIT~~"~~;

- set the remaining LSB of the hyper frame number component of COUNT-C for this radio bearer to zero;

- if at least one transparent mode RLC radio bearers or signalling radio bearers exist in the variable ESTABLISHED_RABS:

  - set the MAC-d HFN component of the COUNT-C for this radio bearer with the MAC-d HFN that is common (refer to subclause 8.5.8) for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" part of the IE "RAB information for setup";

- if the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":

  - start to perform ciphering on the radio bearer in lower layers, using the value of the IE "RB identity" minus one as the value of BEARER in the ciphering algorithm.

NOTE: UTRAN should not use the IE "RB information to setup" to setup radio bearers with RB identity in the range 1-4.

8.6.4.8 RB mapping info

If the IE "RB mapping info" is included, the UE shall:

- for each multiplexing option of the RB:

  - if a transport channel that would not exist as a result of the message (i.e. removed in the same message in IE "Deleted DL TrCH information" and IE "Deleted UL TrCH information") is referred to:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if a multiplexing option that maps a logical channel corresponding to a TM-RLC entity onto RACH, CPCH, FACH or DSCH is included:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if the multiplexing option realises the radio bearer on the uplink (resp. on the downlink) using two logical channels with different values of the IE "Uplink transport channel type" (resp. of the IE "Downlink transport channel type"):

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if that RB is using TM and the IE "Segmentation indication" is set to TRUE and, based on the multiplexing configuration resulting from this message, the logical channel corresponding to it is mapped onto the same transport channel as another logical channel:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if the transport channel considered in that multiplexing option is different from RACH and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - if that RB is using UM or TM and the multiplexing option realises it using two logical channels:

    - set the variable INVALID_CONFIGURATION to TRUE;

  - for each logical channel in that multiplexing option:

    - if the value of the IE "RLC size list" is set to "Explicit list":

      - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the IE transport format set of that transport channel given in the message; or

- if the transport channel this logical channel is mapped on in this multiplexing option is different from RACH, and if a "Transport format set" for that transport channel is not included in the same message, and the value (index) of any IE "RLC size index" in the IE "RLC size index list" does not correspond to an "RLC size" in the stored transport format set of that transport channel; or
- if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
- if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
  - set the variable INVALID_CONFIGURATION to TRUE;

- if the value of the IE "RLC size list" is set to "All":
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and the value of any IE "Logical channel list" in the transport format set is not set to "Configured"; or
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and the value of any IE "Logical channel list" in the stored transport format set of that transport channel is not set to "Configured":
    - set the variable INVALID_CONFIGURATION to TRUE;

- if the value of the IE "RLC size list" is set to "Configured":
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is included in the same message, and for none of the RLC sizes defined for that transport channel in the "Transport format set", the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel; or
  - if a "Transport format set" for the transport channel this logical channel is mapped on in this multiplexing option is not included in the same message, and for none of the RLC sizes defined in the transport format set stored for that transport channel, the "Logical Channel List" is set to "All" or given as an "Explicit List" which contains this logical channel:
    - set the variable INVALID_CONFIGURATION to TRUE;

- if, as a result of the message this IE is included in, several radio bearers can be mapped onto the same transport channel, and the IE "Logical Channel Identity" was not included in the RB mapping info of any of those radio bearers for a multiplexing option on that transport channel or the same "Logical Channel Identity" was used more than once in the RB mapping info of those radio bearers for the multiplexing options on that transport channel:
  - set the variable INVALID_CONFIGURATION to TRUE;
- delete all previously stored multiplexing options for that radio bearer;
- store each new multiplexing option for that radio bearer;
- select and configure the multiplexing options applicable for the transport channels to be used;
- if the IE "Uplink transport channel type" is set to the value "RACH":
  - refer the IE "RLC size index" to the RACH Transport Format Set of the first PRACH received in the IE "PRACH system information list" received in SIB5 or SIB6;
- determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IEs "RLC size list" and/or the IEs "Logical Channel List" included in the applicable "Transport format set" (either the ones received in the same message or the ones stored if none were received); and
- in case the selected multiplexing option is a multiplexing option on RACH:

- ignore the RLC size indexes that do not correspond to any RLC size within the Transport Format Set stored for RACH;

- if RACH is the transport channel to be used on the uplink, if that RB has a multiplexing option on RACH and if it is using AM:
  - apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity;
- if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
  - re-establish the corresponding RLC entity;
  - configure the corresponding RLC entity with the new RLC size;

  for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS for all radio bearers; and

  for the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN for all signalling radio bearers:

  - if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
    - if this IE was included in system information:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~ that will be included in the CELL UPDATE message that will be sent before the next transmission;
    - if this IE was included in CELL UPDATE CONFIRM:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
    - if this IE was included in a reconfiguration message:
      - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for ~~the~~ this CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if that RB is using UM:
  - indicate the largest applicable RLC size to the corresponding RLC entity;
- configure MAC multiplexing according to the selected multiplexing option (MAC multiplexing shall only be configured for a logical channel if the transport channel it is mapped on according to the selected multiplexing option is the same as the transport channel another logical channel is mapped on according to the multiplexing option selected for it);
- configure the MAC with the logical channel priorities according to selected multiplexing option;
- configure the MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB;
- if there is no multiplexing option applicable for the transport channels to be used:
  - set the variable INVALID_CONFIGURATION to TRUE;
- if there is more than one multiplexing option applicable for the transport channels to be used:
  - set the variable INVALID_CONFIGURATION to TRUE.

In case IE "RB mapping info" includes IE "Downlink RLC logical channel info" but IE "Number of downlink RLC logical channels" is absent, the parameter values are exactly the same as for the corresponding UL logical channels. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards

the IE "Channel type", the following rule should be applied to derive the DL channel type from the UL channel included in the IE:

Channel used in UL	DL channel type implied by "same as"
DCH	DCH
RACH	FACH
CPCH	FACH
USCH	DSCH

8.6.5.1 Transport Format Set

If the IE "Transport format set" is included, the UE shall:

- if the transport format set is a RACH TFS received in System Information Block type 5 or 6, and CHOICE "Logical Channel List" has the value "Explicit List":
  - ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a System Information Block, and CHOICE "Logical Channel List" has a value different from 'ALL':
  - ignore that System Information Block;
- if the transport format set for a downlink transport channel is received in a message on a DCCH, and CHOICE "Logical Channel List" has a value different from 'ALL':
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the value of any IE "RB identity" (and "Logical Channel" for RBs using two UL logical channels) in the IE "Logical channel list" does not correspond to a logical channel indicated to be mapped onto this transport channel in any RB multiplexing option (either included in the same message or previously stored and not changed by this message); or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "Configured" while it is set to "All" or given as an "Explicit List" for any other RLC size; or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is set to "All" and for any logical channel mapped to this transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- if the "Logical Channel List" for any of the RLC sizes defined for that transport channel is given as an "Explicit List" that contains a logical channel for which the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is not set to "Configured"; or
- if the "Logical Channel List" for all the RLC sizes defined for that transport channel are given as "Explicit List" and if one of the logical channels mapped onto this transport channel is not included in any of those lists; or
- if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the value of the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is also set to "Configured"; or
- if the IE "Transport Format Set" was not received within the IE "PRACH system information list" and if the "Logical Channel List" for the RLC sizes defined for that transport channel is set to "Configured" and for any logical channel mapped onto that transport channel, the "RLC size list" (either provided in the IE "RB mapping info" if included in the same message, or stored) is given as an "Explicit List" that includes an "RLC size index" that does not correspond to any RLC size in this "Transport Format Set":
  - keep the transport format set if this exists for that transport channel;
  - set the variable INVALID_CONFIGURATION to TRUE;
- if the total number of configured transport formats for the transport channel exceeds maxTF:
  - keep the transport format set if this exists for that transport channel;

- set the variable INVALID_CONFIGURATION to TRUE;

- if the IE "Transport format set" is considered as valid according to the rules above:
  - remove a previously stored transport format set if this exists for that transport channel;
  - store the transport format set for that transport channel;
  - consider the first instance of the parameter *Number of TBs and TTI List* within the *Dynamic transport format information* to correspond to transport format 0 for this transport channel, the second to transport format 1 and so on;
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Dedicated transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following

      TB size = RLC size + MAC header size,

      where:
      - MAC header size is calculated according to [15] if MAC multiplexing is used. Otherwise it is 0 bits;
      - 'RLC size' reflects the RLC PDU size.
  - if the IE "Transport format Set" has the choice "Transport channel type" set to "Common transport channel":
    - calculate the transport block size for all transport formats in the TFS using the following:

      TB size = RLC size
  - if the IE "Number of Transport blocks" <> 0 and IE "RLC size" = 0, no RLC PDU data exists but only parity bits exist for that transport format;
  - if the IE "Number of Transport blocks" = 0, neither RLC PDU neither data nor parity bits exist for that transport format;
  - configure the MAC with the new transport format set (with computed transport block sizes) for that transport channel;
  - if the RB multiplexing option for a RB mapped onto that transport channel (based on the stored RB multiplexing option) is not modified by this message:
    - determine the sets of RLC sizes that apply to the logical channels used by that RB, based on the IE "Logical Channel List" and/or the IE "RLC Size List" from the previously stored RB multiplexing option;
    - if the IE "Transport Format Set" was received within the IE "PRACH system information list":
      - ignore the RLC size indexes in the stored RB multiplexing option that do not correspond to any RLC size in the received Transport Format Set.
    - if the IE "Transport Format Set" was received within the IE "PRACH system information list", if that RB is using AM and if RACH is the transport channel to be used on the uplink:
      - apply the largest size amongst the ones derived according to the previous bullet for the RLC size (or RLC sizes in case the RB is realised using two logical channels) for the corresponding RLC entity;
    - if the IE "Transport Format Set" was not received within the IE "PRACH system information list", and if that RB is using AM and the set of RLC sizes applicable to the logical channel transferring data PDUs has more than one element:
      - set the variable INVALID_CONFIGURATION to true;
    - if that RB is using AM and the RLC size applicable to the logical channel transporting data PDUs is different from the one derived from the previously stored configuration:
      - re-establish the corresponding RLC entity;
      - configure the corresponding RLC entity with the new RLC size;

for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS for all radio bearers; and

for the CN domain as indicated in the IE "CN domain identity" in the variable LATEST_CONFIGURED_CN_DOMAIN for all signalling radio bearers:

- if this IE was included in system information and if the IE "Status" in variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~ that will be included in the CELL UPDATE message that will be sent before the next transmission;
- if this IE was included in CELL UPDATE CONFIRM and if the IE "Status" in the variable CIPHERING_STATUS of this ~~the~~ CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" included in the latest transmitted CELL UPDATE message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if this IE was included in a reconfiguration message and if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the reconfiguration complete message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;
- if this IE was included in ACTIVE SET UPDATE and if the IE "Status" in the variable CIPHERING_STATUS of ~~the~~ this CN domain ~~as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS~~ is set to "Started":
  - set the HFN values for the corresponding RLC entity equal to the value of the IE "START" that will be included in the ACTIVE SET UPDATE COMPLETE message for this ~~the~~ CN domain ~~stored in the variable LATEST_CONFIGURED_CN_DOMAIN~~;

- if that RB is using UM:
  - indicate the largest applicable RLC size to the corresponding RLC entity;
- configure MAC with the set of applicable RLC Sizes for each of the logical channels used for that RB.

For configuration restrictions on Blind Transport Format Detection, see [27].

10.2.9 COUNTER CHECK

This message is used by the UTRAN to indicate the current COUNT-C MSB values associated to each radio bearer utilising UM or AM RLC mode and to request the UE to compare these to its COUNT-C MSB values and to report the comparison results to UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN→UE

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C MSB information	MP	1 to < maxRBallRABs >		For each RB (excluding signalling radio bearers) using UM or AM RLC.
>RB COUNT-C MSB information	MP		RB COUNT-C MSB information 10.3.4.14	

10.2.10 COUNTER CHECK RESPONSE

This message is used by the UE to respond to a COUNTER CHECK message.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Presence	Multi	IE type and reference	Semantics description
Message Type	MP			
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
RB information elements				
RB COUNT-C information	OP	1 to < maxRBallRABs >		
>RB COUNT-C information	MP		RB COUNT-C information 10.3.4.15	

10.2.34 RADIO BEARER SETUP COMPLETE

This message is sent by UE to confirm the establishment of the radio bearer.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Uplink integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	
CHOICE *mode*	OP			
>FDD				(no data)
>TDD				
>>Uplink Timing Advance	OP		Uplink Timing Advance 10.3.6.95	This information element shall be present in case of handover procedure if timing advance is enabled. Calculated timing advance value for the new cell after handover in a synchronous TDD network
START	OP		START 10.3.3.38	This information element is not needed for transparent mode ~~Rbs~~RBs if prior to this procedure there exists one RB using RLC-TM.
RB Information elements				
COUNT-C activation time	OP		Activation time 10.3.3.1	Used for radio bearers mapped on RLC-TM.
Radio bearer uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	
Uplink counter synchronisation info	OP			
>RB with PDCP information list	OP	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP in the case of lossless SRNS relocation
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	
>START list	MP	1 to <maxCNdomains>		START [40] values for all CN domains.
>>CN domain identity	MP		CN domain identity 10.3.1.1	
>>START	MP		START 10.3.3.38	START value to be used in this CN domain.

10.2.43 SECURITY MODE COMMAND

This message is sent by UTRAN to start or reconfigure ciphering and/or integrity protection parameters.

RLC-SAP: AM

Logical channel: DCCH

Direction: UTRAN to UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Security capability	MP		Security capability 10.3.3.37	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	Only present if ciphering shall be controlled
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	Only present if integrity protection shall be controlled
CN Information elements				
CN domain identity	MP		CN domain identity 10.3.1.1	Indicates which cipher and integrity protection keys are applicable
Other information elements				
UE system specific security capability	CH	1 to <maxInterSysMessages>		This IE is included if the IE "Inter-RAT UE radio access capability" was included in RRC CONNECTION SETUP COMPLETE message
>Inter-RAT UE security capability	MP		Inter-RAT UE security capability 10.3.8.8a	

10.2.44 SECURITY MODE COMPLETE

This message is sent by UE to confirm the reconfiguration of ciphering and/or integrity protection.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	MP		Integrity check info 10.3.3.16	
Uplink integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	
RB Information elements				
Radio bearer uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	

10.2.45 SECURITY MODE FAILURE

This message is sent to indicate a failure to act on a received SECURITY MODE CONTROL message.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE→UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Failure cause	MP		Failure cause and error information 10.3.3.14	

10.2.56 UE CAPABILITY INFORMATION

This message is sent by UE to convey UE specific capability information to the UTRAN.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	OP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied
UE radio access capability	OP		UE radio access capability 10.3.3.42	
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	
Other information elements				
UE system specific capability	OP	1 to <maxInterSysMessages>		
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability10.3.8.7	

10.2.57 UE CAPABILITY INFORMATION CONFIRM

This message is sent by UTRAN to confirm that UE capability information has been received.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	
UE information elements				
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	Integrity check info is included if integrity protection is applied

10.3.3.1 Activation time

Activation Time defines the frame number/time at which the operation/changes caused by the related message shall take effect. Values between 0 and 255 indicate the absolute value of CFN (Connection Frame Number) of that frame number/time.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Activation time	MP		Integer(0..255)	CFN [10]

10.3.3.4 Ciphering Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm	MP		Enumerated (UEA0, UEA1)	

10.3.3.5 Ciphering mode info

This information element contains the ciphering specific security mode control information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering mode command	MP		Enumerated (start/restart, stop)	
Ciphering algorithm	CV-*notStop*		Ciphering algorithm 10.3.3.4	
Ciphering activation time for DPCH	OP		Activation time 10.3.3.1	Used for radio bearers mapped on RLC-TM. Only applicable if the UE is already in CELL_DCH state
Radio bearer downlink ciphering activation time info	OP		RB activation time info, 10.3.4.13	Used for radio bearers mapped on RLC-AM or RLC-UM

Condition	Explanation
notStop	The IE is mandatory present if the IE "Ciphering mode command" has the value "start/restart", otherwise the IE is not needed in the message.

10.3.3.16 Integrity check info

The Integrity check info contains the RRC message sequence number needed in the calculation of XMAC-I [40] and the calculated MAC-I.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message authentication code	MP		bit string(32)	MAC-I [40]. The Message Authentication Code bits are numbered b0-b31, where b0 is the least significant bit. The 27 MSB of the IE shall be set to zero and the 5 LSB of the IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.
RRC Message sequence number	MP		Integer (0..15)	The local RRC hyper frame number (RRC HFN) is concatenated with the RRC message sequence number to form the input parameter COUNT-I for the integrity protection algorithm. The IE value shall be set to zero when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm.

10.3.3.17 Integrity protection activation info

This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RRC message sequence number list	MP	4 to 5		The RRC sequence number when a new integrity protection configuration shall be applied, for CCCH (=RB0) and signalling radio bearers in the order RB0, RB1, RB2, RB3, RB4. The value for RB1 shall be ignored if this IE was included in a RRC message sent on RB1. The value for RB2 shall be ignored if this IE was included in a RRC message sent on RB2.
>RRC message sequence number	MP		Integer (0.. 15)	

10.3.3.18 Integrity protection Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection algorithm	MP		Enumerated (UIA1)	

10.3.3.19 Integrity protection mode info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection mode command	MP		Enumerated(start, modify)	
Downlink integrity protection activation info	CV-*modify*		Integrity protection activation info 10.3.3.17	
Integrity protection algorithm	OP		Integrity protection algorithm 10.3.3.18	
Integrity protection initialisation number	CV-*start*		Bit string(32)	FRESH [40]

Condition	Explanation
Start	The IE is mandatory present if the IE "Integrity protection mode command" has the value "start ", otherwise it is not needed in the message.
Modify	The IE is mandatory present if the IE "Integrity protection mode command" has the value "modify" and not needed otherwise.

10.3.3.36 RRC transaction identifier

This IE contains an identification of the RRC procedure transaction local for the type of the message this IE was included within.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RRC transaction identifier	MP		Integer (0..3)	

10.3.3.37 Security capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm capability	MP			
>UEA0	MP		Boolean	The value TRUE means that an unciphered connection after the Security mode control procedure is accepted by the UE.
>UEA1	MP		Boolean	The value TRUE means that UEA1, Kasumi, is supported
>Spare	MP	14	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.
Integrity protection algorithm capability	MP			
>UIA1	MP		Boolean	The value TRUE means that UIA1, Kasumi, is supported
>Spare	MP	15	Boolean	Shall be set to FALSE by UEs complying with this version of the protocol.

NOTE: The UE shall support at least one UEAx other than UEA0 and one UIAx.

10.3.3.38 START

There is a START value per CN domain. The START is used to initialise the 20 MSBs of all hyper frame numbers (MAC-d HFN, RLC UM HFN, RLC AM HFN, RRC HFN) for a CN domain.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
START	MP		Bit string (20)	The START [40] bits are numbered b0-b19, where b0 is the least significant bit.

10.3.4.8 RAB info

This IE contains information used to uniquely identify a radio access bearer.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB identity	MP		RAB identity 10.3.1.14	
CN domain identity	MP		CN domain identity 10.3.1.1	
NAS Synchronization Indicator	OP		NAS Synchronization indicator 10.3.4.12	
Re-establishment timer	MP		Re-establishment timer 10.3.3.30	

10.3.4.10 RAB information for setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB info	MP		RAB info 10.3.4.8	
RB information to setup list	MP	1 to <maxRBperRAB>		
>RB information to setup	MP		RB information to setup 10.3.4.20	

10.3.4.13 RB activation time info

This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Radio bearer activation time	MP	1 to <maxRB>		
>RB identity	MP		RB identity 10.3.4.16	
>RLC sequence number	MP		Integer (0.. 4095)	RLC SN [16] . Used for radio bearers mapped on RLC AM and UM

10.3.4.14 RB COUNT-C MSB information

The MSB of the COUNT-C values of the radio bearer.

Information Element/Group name	Needed	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
COUNT-C-MSB-uplink	MP		Integer (0.. 2^25-1)	25 MSBs from COUNT-C associated to this RB
COUNT-C-MSB-downlink	MP		Integer (0.. 2^25-1)	25 MSBs from COUNT-C associated to this RB

10.3.4.15 RB COUNT-C information

The COUNT-C values of the radio bearer.

Information Element/Group name	Needed	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
COUNT-C-uplink	MP		Integer (0.. 2^32-1)	
COUNT-C-downlink	MP		Integer (0.. 2^32-1)	

10.3.4.16 RB identity

An identification number for the radio bearer affected by a certain message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MP		Integer(1..32)	Values 1-4 shall only be used for signalling radio bearers. The IE value minus one shall be used as BEARER in the ciphering algorithm.

10.3.4.20 RB information to setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MP		RB identity 10.3.4.16	
PDCP info	OP		PDCP info 10.3.4.2	
CHOICE *RLC info type*	MP			
>RLC info			RLC info 10.3.4.23	
>Same as RB			RB identity 10.3.4.16	Identity of RB with exactly the same RLC info IE values
RB mapping info	MP		RB mapping info 10.3.4.21	

NOTE This information element is included within IE "Predefined RB configuration"

10.3.4.24 Signalling RB information to setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	MD		RB identity 10.3.4.16	Default value is specified in subclause 8.6.4.1
CHOICE *RLC info type*	MP			
>RLC info			RLC info 10.3.4.23	
>Same as RB			RB identity 10.3.4.16	Identity of RB with exactly the same RLC info IE values
RB mapping info	MP		RB mapping info 10.3.4.21	

NOTE This information element is included within IE "Predefined RB configuration"

13.4 UE variables

13.4.1 CIPHERING_STATUS

This variable contains information about the current status of ciphering in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Status for each CN domain	MP	<1 to maxCNDomains>		
>CN domain identity	MP		CN domain identity 10.3.1.1	
>Status	MP		Enumerated(Not started, Started)	Set to "Not started" when entering UTRA RRC connected mode. Set to "Not started" when leaving UTRA RRC connected mode.
Reconfiguration	MP		Boolean	TRUE means an RRC procedure performing reconfiguration of ciphering is ongoing. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.5 ESTABLISHED_RABS

This variable is used to store information about the established radio access bearers and signalling radio bearers in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB information	OP	1 to <maxRABsetup>		For each RAB established. Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared when leaving UTRA RRC connected mode.
>RAB info	MP		RAB info 10.3.4.8	
>RB information	MP	1 to <maxRBper RAB>		For each RB belonging to the RAB
>>RB identity	MP		RB identity 10.3.4.16	
>>Subflow	MP		Integer(0..<maxSubflowcount>)	Reference to the RAB subflow implemented by this RB
>>RB started	MD		Enumerated(stopped, started)	Default value is started
Signalling radio bearer information	OP	1 to <maxSRBsetup>		In the order of RB0 and upwards. Cleared when leaving UTRA RRC connected mode.
>RB started	MD		Enumerated(stopped, started)	Default value is started

13.4.8a INCOMPATIBLE_SECURITY_RECONFIGURATION

This variable indicates whether an incompatible simultaneous reconfiguration of a security function has been received.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Incompatible security reconfiguration	MP		Boolean	TRUE: An incompatible simultaneous security reconfiguration has been detected. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.9a INTEGRITY_PROTECTION_ACTIVATION_INFO

This variable contains information to be sent to UTRAN about when a new integrity protection configuration shall be activated in the uplink for signalling radio bearers in case of modification of integrity protection.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink Integrity protection activation info	OP		Integrity protection activation info 10.3.3.17	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.10 INTEGRITY_PROTECTION_INFO

This variable contains information about the current status of the integrity protection in the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
~~Historical status~~	~~MP~~		~~Enumerated(Never been active, Has been active)~~	~~Set to "Never been active" when entering UTRA RRC connected mode.~~
Status	MP		Enumerated(Not started, Started)	Set to "Not started" when entering UTRA RRC connected mode. Set to "Not started" when leaving UTRA RRC connected mode.
Reconfiguration	MP		Boolean	TRUE means a reconfiguration of integrity protection is ongoing. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.
Signalling radio bearer specific integrity protection information	OP	1 to <maxSRBsetup>		When integrity protection is started, status information for RB0- RB4 in that order. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
>Uplink RRC HFN	MP		Bit string (28)	
>Downlink RRC HFN	MP		Bit string (28)	
>Uplink RRC Message sequence number	MP		Integer (0..15)	
>Downlink RRC Message sequence number	OP		Integer (0..15)	

13.4.11 INVALID_CONFIGURATION

This variable indicates whether a received message contained an invalid configuration, by means of invalid values or invalid combinations of information elements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Invalid configuration	MP		Boolean	TRUE: An invalid configuration has been detected. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.11a LATEST_CONFIGURED_CN_DOMAIN

This variable stores the CN-domain that was most recently configured to be used for ciphering and integrity protection.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Latest configured CN domain	OP		CN domain identity 10.3.1.1	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

13.4.20 RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO

This variable contains information to be sent to UTRAN about when a new ciphering configuration shall be activated in the uplink for radio bearers using RLC-AM or RLC-UM.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB uplink ciphering activation time info	OP		RB activation time info 10.3.4.13	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.22 START_THRESHOLD

This variable contains information about the maximum allowed value of the START for a CN domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
THRESHOLD	OP		Integer (0..1048576)	20 bits. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.

13.4.23 START_VALUE_TO_TRANSMIT

This variable contains the value of START for new radio bearer(s) to be transmitted in a response message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
START	OP		START 10.3.3.38	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.27g UE_CAPABILITY_REQUESTED

This variable stores information about the UE capabilities that have been requested by UTRAN but that have not yet been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to < maxInterSysMessages >	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

13.4.28 UE_CAPABILITY_TRANSFERRED

This variable stores information about which UE capabilities that have been transferred to UTRAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE radio access capability	OP		UE radio access capability 10.3.3.42	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE radio access capability extension	OP		UE radio access capability extension 10.3.3.42a	Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
UE system specific capability	OP	1 to <maxSystemCapability>	Inter-RAT UE radio access capability 10.3.8.7	Includes inter-RAT classmark. Cleared when entering UTRA RRC connected mode when not stated otherwise in the procedure. Cleared when leaving UTRA RRC connected mode.
>Inter-RAT UE radio access capability	MP		Inter-RAT UE radio access capability 10.3.8.7	

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CR-Form-v3

CHANGE REQUEST

⌘ **25.331 CR 1219** ⌘ rev **-** ⌘ Current version: **3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Pending integrity protection activation time for UL RB0
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	2001-11-29
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘

Currently, activation time for integrity protection for signaling radio bearer RB0 (i.e., at which activation time the new integrity protection configuration shall be applied in uplink for that signalling radio bearer) is not appropriate.

According to TS 25.331, section 8.6.3.5, UE shall set the activation time for integrity protection for signaling radio bearer RB0 to a value greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one. This covers the problem when a cell update interrupts the reconfiguration procedure, since it forces the UE to use the old integrity protection configuration for the Cell Update.

But in normal cases, this means that the new integrity configuration will only be taken into operation in case there are uplink messages to be sent on RB0. As Cell Update is the only possible message to be sent on RB0 in this situation (and also considering that RB0 is not used at all in CELL_DCH), it might take quite some time before the new configuration is applied.

This has the drawback of blocking any future integrity re-configurations, potentially infinitely, since UE need only keep two active integrity configurations simultaneously. This might in the future lead to failure at establishment of new UE-CN connections (e.g. CS calls).

~~NOTE: Change of integrity prot configuration ordered in CELL UPDATE CONFIRM not covered yet.~~

Summary of change: ⌘

When a procedure reconfiguring integrity protection has been successfully completed, i.e. UE has received RLC confirmation that the UE response message has been successfully delivered, UE shall set the RRC SN for UL RB0 such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration.

		The change only affects UE implementation.
Consequences if not approved:	⌘	Establishment of CN connections might fail.

Clauses affected:	⌘	8.1.12.3, 8.2.2.4, 8.3.1.6		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v4.2.1, CR 1220
Other comments:	⌘			

How to create CRs using this form:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1.12.3 Reception of SECURITY MODE COMMAND message by the UE

Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to subclause 8.6.

If the IE "Ciphering mode info" and the IE "Integrity protection mode info" are both not included in the SECURITY MODE COMMAND, the UE shall:

- set the variable INVALID_CONFIGURATION to TRUE.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if prior to the reception of SECURITY MODE COMMAND, the value of the IE "Status" in the variable "CIPHERING_STATUS" of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is "Not started" and the value of the IE "Historical status" in the variable "INTEGRITY_PROTECTION_INFO" is "Never been active":
  - use the value "START" in the most recently sent IE "START list" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
    - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
    - setting the remaining bits of the hyper frame numbers equal to zero;
- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to transmit the SECURITY MODE COMPLETE message on the uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity"; and
- set the "RLC send sequence number" in IE "Radio bearer uplink ciphering activation time info", at which time the new ciphering configuration shall be applied;
- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;
- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- for radio bearers using RLC-TM:
  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;
  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;
- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

- send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;
- if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message;

- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":

    ~~- if the activation time for integrity protection for uplink RB0 is still pending, according to IE "Uplink integrity protection activation info" in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO (i.e. the last RRC message using the old integrity protection configuration has not been sent):~~

    - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration; (Changed indentation)
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - the procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
  - notify upper layers upon change of the security configuration;
  - if a new security key set has been received for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN:
    - set the START value for this CN domain to 0.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the IE "Downlink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero when the RRC sequence number in a received RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:

    - use the new key;
    - set the IE "Uplink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero when the RRC sequence number in a transmitted RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Uplink integrity protection activation info";

- if a new ciphering key is available:
  - for radio bearers using RLC-TM:
    - use the new key in uplink and downlink;
    - set the HFN component of the COUNT-C to zero at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
  - for radio bearers using RLC-AM and RLC-UM:
    - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
      - use the new key;
      - set the HFN component of the downlink COUNT-C to zero;
    - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
      - use the new key;
      - set the HFN component of the uplink COUNT-C to zero.

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or if the IE "GSM security capability" is not included in the SECURITY MODE COMMAND and is included in the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- and the procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the IE "Downlink counter synchronization info" was included in the reconfiguration message:
  - when RLC has confirmed the successful transmission of the response message:
    - re-establish all AM and UM RLC entities with RB identities larger than 3 and set the first 20 bits of all their HFN values to the START value included in the response message for the corresponding CN domain;
    - re-establish the RLC entities with RB identities 1 and 3 and set the first 20 bits of all their HFN values to the START value included in the response message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
    - set the remaining bits of the HFN values of all AM and UM RLC entities with RB identities different from 2 to zero;
- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;
  - if the received reconfiguration message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:

- for each radio bearer in the variable PDCP_SN_INFO:
  - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
    - configure the RLC entity for that radio bearer to "continue";
  - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info":
  - ~~if the activation time for integrity protection for uplink RB0 is still pending, according to IE "Uplink integrity protection activation info" in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO (i.e. the last RRC message using the old integrity protection configuration has not been sent):~~
  - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration; (changed indentation)
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- clear the variable PDCP_SN_INFO;
- clear the variable START_VALUE_TO_TRANSMIT.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
    - for radio bearers with RB identity larger than 4:
      - re-establish the AM RLC entities;

- if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
  - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;

- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a URA update procedure:
  - stop the URA update procedure; and
  - continue with a cell update procedure;
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
  - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.

3GPP TSG-RAN WG2 Meeting #24
Makuhari, Japan, 26th – 30th November, 2001

Tdoc R2-012769

CR-Form-v3

CHANGE REQUEST

⌘ **25.331 CR 1220** ⌘ rev **-** ⌘ Current version: **4.2.1** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Pending integrity protection activation time for UL RB0			
Source:	⌘	TSG-RAN WG2			
Work item code:	⌘	TEI	***Date:***	⌘	2001-11-29
Category:	⌘	**A**	***Release:***	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘

Currently, activation time for integrity protection for signaling radio bearer RB0 (i.e., at which activation time the new integrity protection configuration shall be applied in uplink for that signalling radio bearer) is not appropriate.

According to TS 25.331, section 8.6.3.5, UE shall set the activation time for integrity protection for signaling radio bearer RB0 to a value greater than or equal to the current value of the RRC sequence number for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO, plus the value of the constant N302 plus one. This covers the problem when a cell update interrupts the reconfiguration procedure, since it forces the UE to use the old integrity protection configuration for the Cell Update.

But in normal cases, this means that the new integrity configuration will only be taken into operation in case there are uplink messages to be sent on RB0. As Cell Update is the only possible message to be sent on RB0 in this situation (and also considering that RB0 is not used at all in CELL_DCH), it might take quite some time before the new configuration is applied.

This has the drawback of blocking any future integrity re-configurations, potentially infinitely, since UE need only keep two active integrity configurations simultaneously. This might in the future lead to failure at establishment of new UE-CN connections (e.g. CS calls).

~~NOTE: Change of integrity prot configuration ordered in CELL UPDATE CONFIRM not covered yet.~~

Summary of change: ⌘

When a procedure reconfiguring integrity protection has been successfully completed, i.e. UE has received RLC confirmation that the UE response message has been successfully delivered, UE shall set the RRC SN for UL RB0 such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration.

		The change only affects UE implementation.
Consequences if not approved:	⌘	Establishment of CN connections might fail.

Clauses affected:	⌘	8.1.12.3, 8.2.2.4, 8.3.1.6		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.331 v3.8.0, CR 1219
Other comments:	⌘			

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Upon reception of the SECURITY MODE COMMAND message, the UE shall perform the actions for the received information elements according to subclause 8.6.

If the IE "Ciphering mode info" and the IE "Integrity protection mode info" are both not included in the SECURITY MODE COMMAND, the UE shall:

- set the variable INVALID_CONFIGURATION to TRUE.

If the IE "Security capability" is the same as indicated by variable UE_CAPABILITY_TRANSFERRED, and the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- set the variable LATEST_CONFIGURED_CN_DOMAIN equal to the IE "CN domain identity";
- if prior to the reception of SECURITY MODE COMMAND, the value of the IE "Status" in the variable "CIPHERING_STATUS" of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is "Not started" and the value of the IE "Historical status" in the variable "INTEGRITY_PROTECTION_INFO" is "Never been active":
  - use the value "START" in the most recently sent IE "START list" that belongs to the CN domain as indicated in the IE "CN domain identity" to initialise all hyper frame numbers for all the signalling radio bearers; while
    - setting the 20 most significant bits of the hyper frame numbers for all signalling radio bearers to the START for that CN domain;
    - setting the remaining bits of the hyper frame numbers equal to zero;
- suspend all radio bearers and signalling radio bearers (except the signalling radio bearer used to transmit the SECURITY MODE COMPLETE message on the uplink DCCH in RLC-AM) using RLC-AM or RLC-UM that belong to the CN domain indicated in the IE "CN domain identity"; and
- set the "RLC send sequence number" in IE "Radio bearer uplink ciphering activation time info", at which time the new ciphering configuration shall be applied;
- set the IE "RRC transaction identifier" in the SECURITY MODE COMPLETE message to the value of "RRC transaction identifier" in the entry for the SECURITY MODE COMMAND message in the table "Accepted transactions" in the variable TRANSACTIONS; and
- clear that entry;
- if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO, for the respective radio bearer and signalling radio bearer;
- if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- for radio bearers using RLC-TM:
  - apply the old ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN less than the number indicated in the IE "Ciphering activation time for DPCH", as sent by the UTRAN;
  - apply the new ciphering configuration for the receiving and transmission of RLC TrD PDUs with CFN greater than or equal to the number indicated in IE "Ciphering activation time for DPCH", as sent by the UTRAN;
- when the radio bearers and signalling radio bearers using RLC-AM or RLC-UM have been suspended:

- send a SECURITY MODE COMPLETE message on the uplink DCCH in AM RLC, using the old ciphering configurations;
- if the IE "Integrity protection mode info" was present in the SECURITY MODE COMMAND message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted SECURITY MODE COMPLETE message;

- when the successful delivery of the SECURITY MODE COMPLETE message has been confirmed by RLC:
  - resume data transmission on any suspended radio bearer and signalling radio bearer mapped on RLC-AM or RLC-UM;
  - if the SECURITY MODE COMMAND message contained the IE "Ciphering mode info":
    - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
    - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - if the SECURITY MODE COMMAND message contained the IE "Integrity protection mode info":

    ~~- if the activation time for integrity protection for uplink RB0 is still pending, according to IE "Uplink integrity protection activation info" in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO (i.e. the last RRC message using the old integrity protection configuration has not been sent):~~

    - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration; (Changed indentation)
    - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
    - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - the procedure ends. If a RLC reset or re-establishment occurs after the SECURITY MODE COMPLETE message has been confirmed by RLC, but before the activation time for the new ciphering configuration has been reached, then the activation time shall be ignored and the new ciphering configuration shall be applied immediately after the RLC reset or RLC re-establishment;
  - notify upper layers upon change of the security configuration;
  - if a new security key set has been received for the CN domain as indicated in the variable LATEST_CONFIGURED_CN_DOMAIN:
    - set the START value for this CN domain to 0.

For radio bearers and signalling radio bearers used by the CN indicated in the IE "CN domain identity", the UE shall:

- if a new integrity protection key has been received:
  - in the downlink:
    - use the new key;
    - set the IE "Downlink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the downlink COUNT-I to zero when the RRC sequence number in a received RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Downlink integrity protection activation info" included in the IE "Integrity protection mode info";

    in the uplink:

    - use the new key;
    - set the IE "Uplink RRC HFN" for all signalling radio bearers in the variable INTEGRITY_PROTECTION_INFO of the uplink COUNT-I to zero when the RRC sequence number in a transmitted RRC message on the particular signalling radio bearer reaches the value for that signalling radio bearer indicated in IE "Uplink integrity protection activation info";

- if a new ciphering key is available:
  - for radio bearers using RLC-TM:
    - use the new key in uplink and downlink;
    - set the HFN component of the COUNT-C to zero at the CFN as indicated in the IE "Ciphering activation time for DPCH" in the IE "Ciphering mode info";
  - for radio bearers using RLC-AM and RLC-UM:
    - in the downlink, at and after the RLC sequence number indicated in IE "Radio bearer downlink ciphering activation time info" in the IE "Ciphering mode info":
      - use the new key;
      - set the HFN component of the downlink COUNT-C to zero;
    - in the uplink, at and after the RLC sequence number indicated in IE "Radio bearer uplink ciphering activation time info":
      - use the new key;
      - set the HFN component of the uplink COUNT-C to zero.

If the IE "Security capability" is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or the IE "GSM security capability" (if included in the SECURITY MODE COMMAND) is not the same as indicated by the variable UE_CAPABILITY_TRANSFERRED, or if the IE "GSM security capability" is not included in the SECURITY MODE COMMAND and is included in the variable UE_CAPABILITY_TRANSFERRED, the UE shall:

- release all its radio resources;
- indicate the release of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
- clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
- clear the variable ESTABLISHED_RABS;
- enter idle mode;
- perform actions when entering idle mode as specified in subclause 8.5.2;
- and the procedure ends.

8.2.2.4 Transmission of a response message by the UE, normal case

In case the procedure was triggered by reception of a RADIO BEARER SETUP message, the UE shall:

- transmit a RADIO BEARER SETUP COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RECONFIGURATION message, the UE shall:

- transmit a RADIO BEARER RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a RADIO BEARER RELEASE message, the UE shall:

- transmit a RADIO BEARER RELEASE COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a TRANSPORT CHANNEL RECONFIGURATION message, the UE shall:

- transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

In case the procedure was triggered by reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall:

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE as response message on the uplink DCCH using AM RLC;

If the new state is CELL_DCH or CELL_FACH, the response message shall be transmitted using the new configuration after the state transition, and the UE shall:

- if the IE "Downlink counter synchronization info" was included in the reconfiguration message:
  - when RLC has confirmed the successful transmission of the response message:
    - re-establish all AM and UM RLC entities with RB identities larger than 3 and set the first 20 bits of all their HFN values to the START value included in the response message for the corresponding CN domain;
    - re-establish the RLC entities with RB identities 1 and 3 and set the first 20 bits of all their HFN values to the START value included in the response message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
    - set the remaining bits of the HFN values of all AM and UM RLC entities with RB identities different from 2 to zero;
- if the variable PDCP_SN_INFO is empty:
  - if the received reconfiguration message contained the IE "Ciphering mode info":
    - when RLC has confirmed the successful transmission of the response message:
      - notify upper layers upon change of the security configuration;
      - perform the actions below;
  - if the received reconfiguration message did not contain the IE "Ciphering mode info":
    - when RLC has been requested to transmit the response message:
      - perform the actions below;
- if the variable PDCP_SN_INFO is non-empty:
  - when RLC has confirmed the successful transmission of the response message:

- for each radio bearer in the variable PDCP_SN_INFO:
  - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
    - configure the RLC entity for that radio bearer to "continue";
  - perform the actions below.

If the new state is CELL_PCH or URA_PCH, the response message shall be transmitted using the old configuration before the state transition, but the new C-RNTI shall be used if the IE "New C-RNTI" was included in the received reconfiguration message, and the UE shall:

- when RLC has confirmed the successful transmission of the response message:
  - for each radio bearer in the variable PDCP_SN_INFO:
    - if the IE "RB started" in the variable ESTABLISHED_RABS is set to "started":
      - configure the RLC entity for that radio bearer to "continue";
  - enter the new state (CELL_PCH or URA_PCH, respectively);
  - perform the actions below.

The UE shall:

- set the variable ORDERED_RECONFIGURATION to FALSE;
- if the received reconfiguration message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
- if the received reconfiguration message contained the IE "Integrity protection mode info":
  - ~~if the activation time for integrity protection for uplink RB0 is still pending, according to IE "Uplink integrity protection activation info" in the variable INTEGRITY_PROTECTION_ACTIVATION_INFO (i.e. the last RRC message using the old integrity protection configuration has not been sent):~~
  - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration; (changed indentation)
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- clear the variable PDCP_SN_INFO;
- clear the variable START_VALUE_TO_TRANSMIT.

8.3.1.6 Reception of the CELL UPDATE CONFIRM/URA UPDATE CONFIRM message by the UE

When the UE receives a CELL UPDATE CONFIRM/URA UPDATE CONFIRM message; and

- if the message is received on the CCCH, and IE "U-RNTI" is present and has the same value as the variable U_RNTI, or;
- if the message is received on DCCH;

the UE shall:

- stop timer T302;
- in case of a cell update procedure and the CELL UPDATE CONFIRM message:
  - includes "RB information elements"; and/or
  - includes "Transport channel information elements"; and/or
  - includes "Physical channel information elements"; and
  - if the variable ORDERED_RECONFIGURATION is set to FALSE:
    - set the variable ORDERED_RECONFIGURATION to TRUE;
- act upon all received information elements as specified in subclause 8.6, unless specified otherwise in the following:
  - use the transport channel(s) applicable for the physical channel types that is used; and
  - if the IE "TFS" is neither included nor previously stored in the UE for that transport channel(s):
    - use the TFS given in system information.
  - if none of the TFS stored is compatible with the physical channel:
    - delete the stored TFS;
    - use the TFS given in system information.
  - perform the physical layer synchronisation procedure as specified in [29];
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB2, RB3 and RB4)":
    - re-establish the RLC entities for signalling radio bearer RB2, signalling radio bearer RB3 and signalling radio bearer RB4 (if established);
    - if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN is set to "Started":
      - set the HFN values for AM RLC entities with RB identity 2,RB identity 3 and RB identity 4 (if established) equal to the START value included in the latest transmitted CELL UPDATE message for the CN domain stored in the variable LATEST_CONFIGURED_CN_DOMAIN;
  - if the CELL UPDATE CONFIRM message includes the IE "RLC re-establish indicator (RB>4)":
    - for radio bearers with RB identity larger than 4:
      - re-establish the AM RLC entities;

- if the value of the IE "Status" in the variable CIPHERING_STATUS of the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS is set to "Started":
  - set the HFN values for AM RLC entities equal to the START value included in this CELL UPDATE message for the CN domain as indicated in the IE "CN domain identity" in the IE "RAB info" in the variable ESTABLISHED_RABS;

- enter a state according to subclause 8.6.3.3 applied on the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message.

If the UE after state transition enters CELL_DCH state, it shall:

- not prohibit periodical status transmission in RLC.

If the UE after state transition remains in CELL_FACH state, it shall

- start the timer T305 using its initial value if timer T305 is not running and periodical cell update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select PRACH according to subclause 8.5.17;
- select Secondary CCPCH according to subclause 8.5.19;
- not prohibit periodical status transmission in RLC;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - ignore that IE and stop using DRX;

If the UE after state transition enters URA_PCH or CELL_PCH state, it shall

- prohibit periodical status transmission in RLC;
- clear the variable C_RNTI;
- stop using that C_RNTI just cleared from the variable C_RNTI in MAC;
- start the timer T305 using its initial value if timer T305 is not running and periodical update has been configured by T305 in the IE "UE Timers and constants in connected mode" set to any other value than "infinity";
- select Secondary CCPCH according to subclause 8.5.19;
- if the IE "UTRAN DRX cycle length coefficient" is included in the same message:
  - use the value in the IE "UTRAN DRX Cycle length coefficient" for calculating Paging Occasion and PICH Monitoring Occasion as specified in subclause 8.6.3.2 in CELL_PCH state.

If the UE after the state transition remains in CELL_FACH state and;

- the contents of the variable C_RNTI are empty;

it shall check the value of V302 and

- If V302 is equal to or smaller than N302:
  - if, caused by the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message,
    - the IE "Reconfiguration" in the variable CIPHERING_STATUS is set to TRUE; and/or
    - the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO is set to TRUE:
      - abort the ongoing integrity and/or ciphering reconfiguration;
      - if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Ciphering mode info":

- set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
- clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;

- in case of a URA update procedure:
  - stop the URA update procedure; and
  - continue with a cell update procedure;
- set the contents of the CELL UPDATE message according to subclause 8.3.1.3, except for the IE "Cell update cause" which shall be set to "cell reselection";
- submit the CELL UPDATE message for transmission on the uplink CCCH;
- increment counter V302;
- restart timer T302 when the MAC layer indicates success or failure to transmit the message;

- If V302 is greater than N302:
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
  - in case of a cell update procedure:
    - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - in case of a URA update procedure:
    - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
  - release all its radio resources;
  - indicate release (abort) of the established signalling connections (as stored in the variable ESTABLISHED_SIGNALLING_CONNECTIONS) and established radio access bearers (as stored in the variable ESTABLISHED_RABS) to upper layers;
  - clear the variable ESTABLISHED_SIGNALLING_CONNECTIONS;
  - clear the variable ESTABLISHED_RABS;
  - enter idle mode;
  - other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2;
  - and the procedure ends.

If the UE after the state transition remains in CELL_FACH state and

- a C-RNTI is stored in the variable C_RNTI;

or

the UE after the state transition moves to another state than the CELL_FACH state;

the UE shall:

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - include and set the IE "Radio bearer uplink ciphering activation time info" in any response message transmitted below to the value of the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info" with the IE "Integrity protection mode command" set to "Modify":
  - include and set the IE "Integrity protection activation info" in any response message transmitted below to the value of the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the CELL UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry.
- in case of a URA update procedure:
  - set the IE "RRC transaction identifier" in any response message transmitted below to the value of "RRC transaction identifier" in the entry for the URA UPDATE CONFIRM message in the table "Accepted transactions" in the variable TRANSACTIONS; and
  - clear that entry;
- if the variable PDCP_SN_INFO is non-empty:
  - include the IE "RB with PDCP information list" in any response message transmitted below and set it to the value of the variable PDCP_SN_INFO;
- if the received CELL UPDATE CONFIRM or URA UPDATE CONFIRM message included the IE "Downlink counter synchronisation info":
  - calculate the START value according to subclause 8.5.9;
  - include the calculated START values for each CN domain in the IE "START list" in the IE "Uplink counter synchronisation info" in any response message transmitted below;
- transmit a response message as specified in subclause 8.3.1.7;
- if the IE "Integrity protection mode info" was present in the CELL UPDATE CONFIRM or URA UPDATE CONFIRM message:
  - start applying the new integrity protection configuration in the uplink for signalling radio bearer RB2 from and including the transmitted response message;
  - set "Uplink RRC Message sequence number" for signalling radio bearer RB0 in the variable INTEGRITY_PROTECTION_INFO to a value such that next RRC message to be sent on uplink RB0 will use the new integrity protection configuration;
- if the variable ORDERED_RECONFIGURATION is set to TRUE caused by the received CELL UPDATE CONFIRM message in case of a cell update procedure:
  - set the variable ORDERED_RECONFIGURATION to FALSE;
- clear the variable PDCP_SN_INFO;
- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Ciphering mode info":
  - set the IE "Reconfiguration" in the variable CIPHERING_STATUS to FALSE; and
  - clear the variable RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO;

- if the CELL UPDATE CONFIRM / URA UPDATE CONFIRM message contained the IE "Integrity protection mode info":
  - set the IE "Reconfiguration" in the variable INTEGRITY_PROTECTION_INFO to FALSE; and
  - clear the variable INTEGRITY_PROTECTION_ACTIVATION_INFO;
- in case of a cell update procedure:
  - clear the entry for the CELL UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- in case of a URA update procedure:
  - clear the entry for the URA UPDATE CONFIRM message in the table "Rejected transactions" in the variable TRANSACTIONS;
- set the variable CELL_UPDATE_STARTED to FALSE;

The procedure ends.