TSG-RAN Meeting #15 *RP-020094*
Jeju-do, Korea, 5 - 8 March 2002

Title: **Agreed CRs (Rel-5) for WI "High Speed Downlink Packet Access (HSDPA) - Layer 2 and 3 aspects"**

Source: **TSG-RAN WG2**

Agenda item: **9.7.2**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio	Workite
R2-020576	agreed	25.301	062	1	Rel-5	Introduction of HSDPA	B	4.2.0	5.0.0	HSDPA-L23
R2-020554	agreed	25.302	122	2	Rel-5	Introduction of HSDPA	B	4.3.0	5.0.0	HSDPA-L23
R2-020558	agreed	25.306	029	2	Rel-5	HSDPA UE capabilities	B	4.3.0	5.0.0	HSDPA-L23
R2-020559	agreed	25.321	104	2	Rel-5	Introduction of HSDPA	B	4.3.0	5.0.0	HSDPA-L23
R2-020557	agreed	25.331	1305	2	Rel-5	Introduction of HSDPA	B	4.3.0	5.0.0	HSDPA-L23

3GPP TSG-RAN WG2 Meeting #27
Orlando, USA, 18-22 February 2002

Tdoc R2-020576

CR-Form-v5

CHANGE REQUEST

⌘ **25.301**	**CR**	**062**	⌘ **rev**	**r1** ⌘	Current version:	**4.2.0** ⌘

*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: ⌘	Introduction of HSDPA		
Source: ⌘	TSG-RAN WG2		
Work item code: ⌘	HSDPA-L23	***Date:*** ⌘	22.02.2002
Category: ⌘	**B** *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.	***Release:*** ⌘	REL-5 *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: ⌘	Inclusion of HSDPA features
Summary of change: ⌘	This document contains the agreed changes for HSDPA for the TS25.301 as of the end of the RAN2 meeting in Sophia Antipolis and further updated at RAN2#27 Orlando. The base document for the CR has been updated to TS25.301v4.2.0 as approved by RAN P#14 held in Kyoto in December 2001. This now is the agreed version of the CR to 25.301 for HSDPA to be presented to the RAN P#15 in March. Main changes include description of HARQ functionality for HS-DSCH transmission and insequence delivery and assembly/dissassembly of higher layer PDUs on HS-DSCH (5.3.1.2), description of logical channel ID for HS-DSCH (5.3.6), protocol termination for HS-DSCH (5.6.9), deletion of HI (HS-DSCH indicator) from Abbreviations and 5.6.9.2.
Consequences if not approved: ⌘	HSDPA features not described in 25.301

Clauses affected: ⌘	2, 3.1, 5.1, 5.2.1.1, 5.3.1.1.2.2, 5.3.1.2, 5.3.5, 5.3.5.19 (new), 5.3.5.20 (new), 5.3.6, 5.6.9 (new), 6.2
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments: ⌘	

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1 Scope

The present document shall provide an overview and overall description of the UE-UTRAN radio interface protocol architecture as agreed within the 3GPP TSG RAN working group 2. Details of the radio protocols will be specified in companion documents.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 23.110: "UMTS Access Stratum; Services and Functions".

[2] 3GPP TS 25.401: "RAN Overall Description".

[3] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[4] 3GPP TS 25.302: "Services provided by the Physical Layer".

[5] 3GPP TS 25.303: "Interlayer Procedures in Connected Mode".

[6] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[7] 3GPP TS 25.321: "MAC Protocol Specification".

[8] 3GPP TS 25.322: "RLC Protocol Specification".

[9] 3GPP TS 25.323: "PDCP Protocol Specification".

[10] 3GPP TS 25.324: "BMC Protocol Specification".

[11] 3GPP TS 25.331: "RRC Protocol Specification".

[12] 3GPP TS 25.224: "Physical Layer Procedures (TDD)".

[13] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[14] 3GPP TS 33.105: "Cryptographic Algorithm Requirements".

[15] 3GPP TS 33.102: "Security Architecture".

[16] 3GPP TS 44.005: "Data Link (DL) layer; General aspects".

[17] 3GPP TS 25.308: " UTRA High Speed Downlink Packet Access (HSDPA); Overall description".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [3] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ARQ	Automatic Repeat Request
AS	Access Stratum
ASC	Access Service Class
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
BMC	Broadcast/Multicast Control
C-	Control-
CC	Call Control
CCCH	Common Control Channel
CCH	Control Channel
CCTrCH	Coded Composite Transport Channel
CN	Core Network
CPCH	Common Packet channel
CRC	Cyclic Redundancy Check
CTCH	Common Traffic Channel
DC	Dedicated Control (SAP)
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCH	Dedicated Channel
DL	Downlink
DRNC	Drift Radio Network Controller
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Link Access Channel
FCS	Frame Check Sequence
FDD	Frequency Division Duplex
GC	General Control (SAP)
HARQ	Hybrid Automatic Repeat Request
~~HI~~	~~HS-DSCH Indicator~~
HO	Handover
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
ITU	International Telecommunication Union
kbps	kilobits per second
L1	Layer 1 (physical layer)
L2	Layer 2 (data link layer)
L3	Layer 3 (network layer)
LAC	Link Access Control
LAI	Location Area Identity
MAC	Medium Access Control
MM	Mobility Management
NAS	Non-Access Stratum
Nt	Notification (SAP)
PCCH	Paging Control Channel

PCH	Paging Channel
PDCP	Packet Data Convergence Protocol
PDU	Protocol Data Unit
PHY	Physical layer
PhyCH	Physical Channels
RAB	Radio Access Bearer
RACH	Random Access Channel
RB	Radio Bearer
RLC	Radio Link Control
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNTI	Radio Network Temporary Identity
RRC	Radio Resource Control
SAP	Service Access Point
SDU	Service Data Unit
SHCCH	Shared Channel Control Channel
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
TCH	Traffic Channel
TDD	Time Division Duplex
TFCI	Transport Format Combination Indicator
TFI	Transport Format Indicator
TFRI	Transport Format and Resource Indicator
TMSI	Temporary Mobile Subscriber Identity
TPC	Transmit Power Control
TSN	Transmit Sequence Number
U-	User-
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
USCH	Uplink Shared Channel
UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network
UuS	Uu (Radio Interface) Stratum

4 Assumed UMTS Architecture

Figure 1 shows the assumed UMTS architecture as outlined in [1]. The figure shows the UMTS architecture in terms of its entities User Equipment (UE), UTRAN and Core Network. The respective reference points Uu (Radio Interface) and Iu (CN-UTRAN interface) are shown. The figure illustrates furthermore the high-level functional grouping into the Access Stratum and the Non-Access Stratum.

The Access Stratum offers services through the following Service Access Points (SAP) to the Non-Access Stratum:

- General Control (GC) SAPs;
- Notification (Nt) SAPs; and
- Dedicated Control (DC) SAPs.

The SAPs are marked with circles in Figure 1.

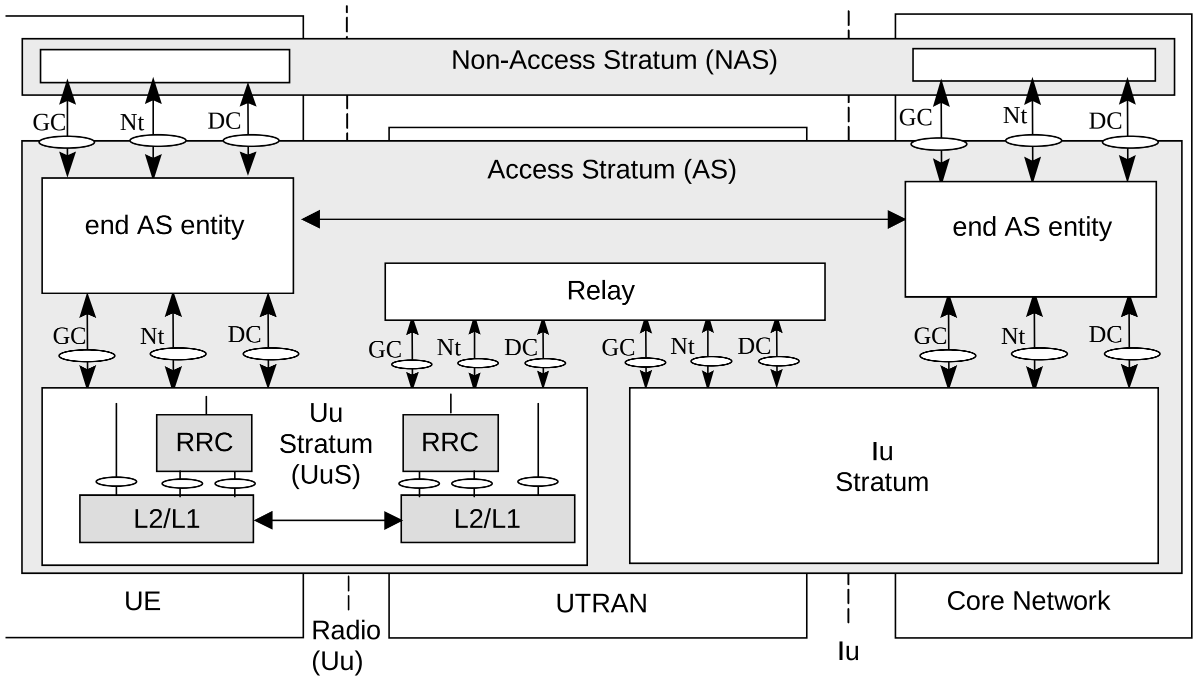


Figure 1: Assumed UMTS Architecture

The model in Figure 1 distinguishes the end AS entities [1], which provide the services to higher layers, from the local entities, which provide services over respectively the Uu and the Iu reference points.

The Uu Stratum (UuS) block includes the radio interface protocol stack described in subclause 5.1.

5 Radio interface protocol architecture

5.1 Overall protocol structure

The radio interface is layered into three protocol layers:

- the physical layer (L1);
- the data link layer (L2);
- network layer (L3).

Layer 2 is split into following sublayers: Medium Access Control (MAC), Radio Link Control (RLC), Packet Data Convergence Protocol (PDCP) and Broadcast/Multicast Control (BMC).

Layer 3 and RLC are divided into Control (C-) and User (U-) planes. PDCP and BMC exist in the U-plane only.

In the C-plane, Layer 3 is partitioned into sublayers where the lowest sublayer, denoted as Radio Resource Control (RRC), interfaces with layer 2 and terminates in the UTRAN. The next sublayer provides 'Duplication avoidance' functionality as specified in [13]. It terminates in the CN but is part of the Access Stratum; it provides the Access Stratum Services to higher layers. The higher layer signalling such as Mobility Management (MM) and Call Control (CC) is assumed to belong to the non-access stratum, and therefore not in the scope of 3GPP TSG RAN. On the general level, the protocol architecture is similar to the current ITU-R protocol architecture, ITU-R M.1035.

Figure 2 shows the radio interface protocol architecture. Each block in Figure 2 represents an instance of the respective protocol. Service Access Points (SAP) for peer-to-peer communication are marked with circles at the interface between sublayers. The SAP between MAC and the physical layer provides the transport channels (cf. subclause 5.2.1.1). The SAPs between RLC and the MAC sublayer provide the logical channels (cf. subclause 5.3.1.1.1). The RLC layer provides three types of SAPs, one for each RLC operation mode (UM, AM, and TM, see [8]). PDCP and BMC are accessed by PDCP and BMC SAPs, respectively. The service provided by layer 2 is referred to as the radio bearer. The

C-plane radio bearers, which are provided by RLC to RRC, are denoted as signalling radio bearers. In the C-plane, the interface between 'Duplication avoidance' and higher L3 sublayers (CC, MM) is defined by the General Control (GC), Notification (Nt) and Dedicated Control (DC) SAPs.

NOTE: The SAPs shown in Figure 2 are examples. For details on the definition of SAPs refer to the respective radio interface protocol specification.

Also shown in the figure are connections between RRC and MAC as well as RRC and L1 providing local inter-layer control services. An equivalent control interface exists between RRC and the RLC sublayer, between RRC and the PDCP sublayer and between RRC and BMC sublayer. These interfaces allow the RRC to control the configuration of the lower layers. For this purpose separate Control SAPs are defined between RRC and each lower layer (PDCP, RLC, MAC, and L1).

The RLC sublayer provides ARQ functionality closely coupled with the radio transmission technique used. There is no difference between RLC instances in C and U planes.

The MAC sublayer is made up of several different MAC entities, MAC-d, MAC-c/sh and MAC-hs.

The MAC-hs entity provides Hybrid ARQ functionality, and is only used on the HS-DSCH.

The UTRAN can be requested by the CN to prevent all loss of data (i.e. independently of the handovers on the radio interface), as long as the Iu connection point is not modified. This is a basic requirement to be fulfilled by the UTRAN retransmission functionality as provided by the RLC sublayer.

However, in case of the Iu connection point is changed (e.g. SRNS relocation, streamlining), the prevention of the loss of data may not be guaranteed autonomously by the UTRAN but relies on 'Duplication avoidance' functions in the CN.

There are primarily two kinds of signalling messages transported over the radio interface - RRC generated signalling messages and NAS messages generated in the higher layers. On establishment of the signalling connection between the peer RRC entities three or four UM/AM signalling radio bearers may be set up. Two of these bearers are set up for transport of RRC generated signalling messages - one for transferring messages through an unacknowledged mode RLC entity (see subclause 5.3.2. for details on RLC modes) and the other for transferring messages through an acknowledged mode RLC entity. One signalling radio bearer is set up for transferring NAS messages set to "high priority" by the higher layers. An optional signalling radio bearer may be set up for transferring NAS messages set to "low priority" by the higher layers. Subsequent to the establishment of the signalling connection zero to several TM signalling radio bearers may be set up for transferring RRC signalling messages using transparent mode RLC.

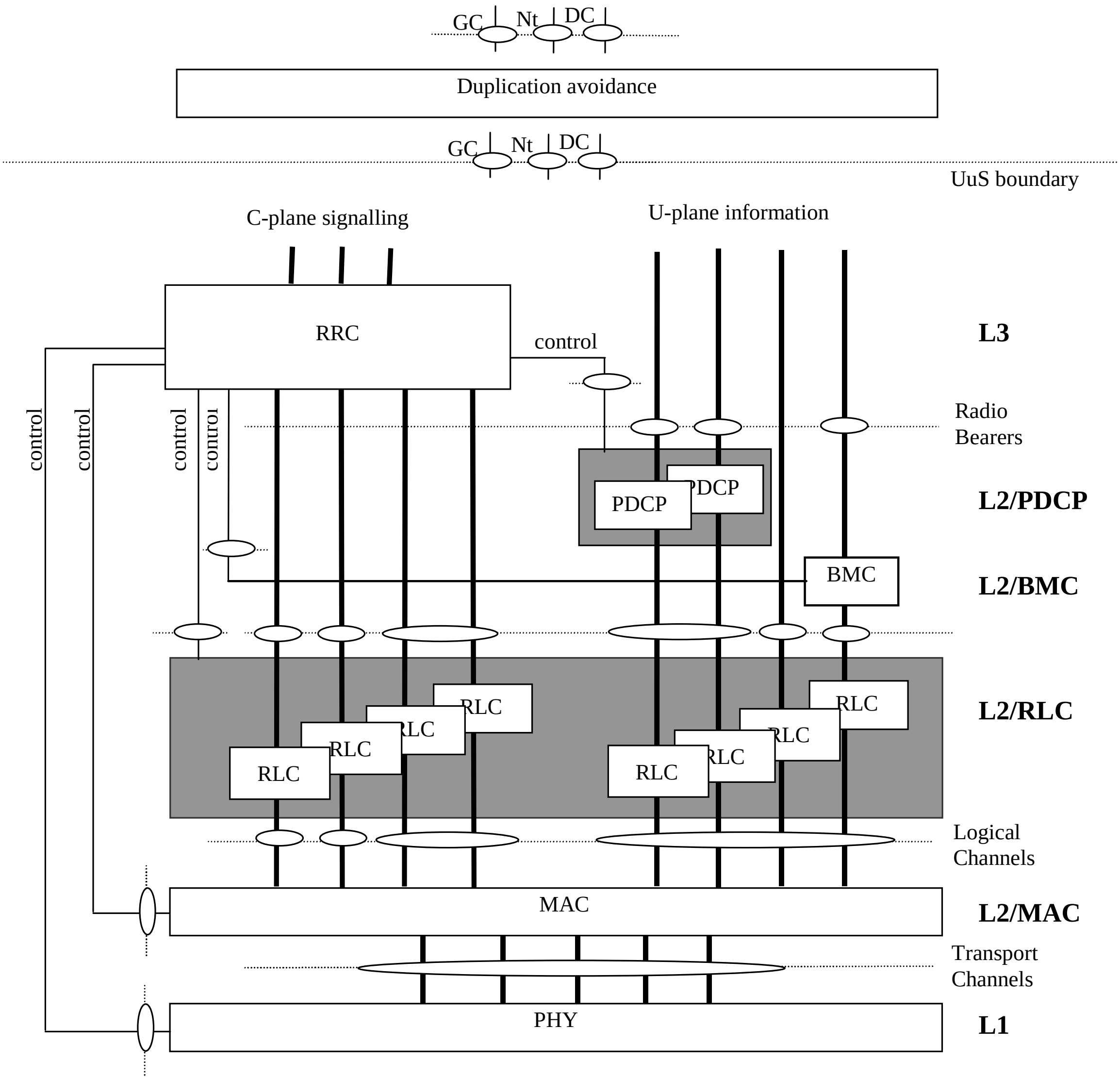


Figure 2: Radio Interface protocol architecture (Service Access Points marked by circles)

5.1.1 Service access points and service primitives

Each layer provides services at Service Access Points (SAPs). A service is defined by a set of service primitives (operations) that a layer provides to upper layer(s).

Control services, allowing the RRC layer to control lower layers locally (i.e. not requiring peer-to-peer communication) are provided at Control SAPs (C-SAP). Note that C-SAP primitives can bypass one or more sublayers, see Figure 2.

In the radio interface protocol specifications, the following naming conventions for primitives shall be applicable:

- Primitives provided by SAPs between adjacent layers shall be prefixed with the name of the service-providing layer, i.e. PHY, MAC, RLC, PDCP, BMC or UUS.
- Primitives provided by SAPs to an application shall be prefixed with the name of the service-providing layer, i.e. RRC.
- Primitives provided by Control SAPs, in addition to the name of the service-providing layer, shall be prefixed with a "C", i.e. CPHY, CMAC, CRLC, CPDCP or CBMC.

This principle leads to the following notations, where <Type> corresponds to request, indication, response or confirm type of primitives:

Primitives between PHY and MAC:

PHY- <Generic name> - <Type>

Primitives between PHY and RRC (over C-SAP):

CPHY- <Generic name> - <Type>

Primitives between MAC and RLC:

MAC- <Generic name> - <Type>

Primitives between MAC and RRC (over C-SAP):

CMAC- <Generic name> - <Type>

Primitives between RLC and upper layers, between RLC and RRC for data transfer and between RLC and PDCP:

RLC- <Generic name> - <Type>

Primitives between RLC and RRC for control of RLC (over C-SAP):

CRLC- <Generic name> - <Type>

Primitives above Uu Stratum:

UUS- <Generic name> - <Type>

Primitives between PDCP and non-access stratum:

PDCP- <Generic name> - <Type>

Primitives between PDCP and RRC (over C-SAP):

CPDCP- <Generic name> - <Type>

Primitives between BMC and upper layer:

BMC- <Generic name> - <Type>

Primitives between BMC and RRC for control of BMC (over C-SAP):

CBMC- <Generic name> - <Type>

In this model, some UUS primitives map directly to RLC primitives without intervening function.

5.2 Layer 1 Services and Functions

This subclause shall provide an overview on services and functions provided by the physical layer. A detailed description of Layer 1 general requirements can be found in [4].

5.2.1 L1 Services

The physical layer offers information transfer services to MAC and higher layers. The physical layer transport services are described by *how* and with what characteristics data are transferred over the radio interface. An adequate term for this is 'Transport Channel'.

NOTE: This should be clearly separated from the classification of *what* is transported, which relates to the concept of logical channels. Thus DCH is used to denote that the physical layer offers the same type of service for both control and traffic.

5.2.1.1 Transport channels

A general classification of transport channels is into two groups:

- common transport channels (where there is a need for inband identification of the UEs when particular UEs are addressed); and

- dedicated transport channels (where the UEs are identified by the physical channel, i.e. code and frequency for FDD and code, time slot and frequency for TDD).

Common transport channel types are (a more detailed description can be found in [4]):

- **Random Access Channel (RACH)**

  A contention based uplink channel used for transmission of relatively small amounts of data, e.g. for initial access or non-real-time dedicated control or traffic data.

- **Common Packet Channel (CPCH)**

  A contention based channel used for transmission of bursty data traffic. This channel only exists in FDD mode and only in the uplink direction. The common packet channel is shared by the UEs in a cell and therefore, it is a common resource. The CPCH is fast power controlled.

- **Forward Access Channel (FACH)**

  Common downlink channel without closed-loop power control used for transmission of relatively small amount of data.

- **Downlink Shared Channel (DSCH)**

  A downlink channel shared by several UEs carrying dedicated control or traffic data.

- **Uplink Shared Channel (USCH)**

  An uplink channel shared by several UEs carrying dedicated control or traffic data, used in TDD mode only.

- **Broadcast Channel (BCH)**

  A downlink channel used for broadcast of system information into an entire cell.

- **Paging Channel (PCH)**

  A downlink channel used for broadcast of control information into an entire cell allowing efficient UE sleep mode procedures. Currently identified information types are paging and notification. Another use could be UTRAN notification of change of BCCH information.

- **High Speed Downlink Shared Channel (HS-DSCH)**

  A downlink channel shared between UEs by allocation of individual codes, from a common pool of codes assigned for the channel.

Dedicated transport channel types are:

- **Dedicated Channel (DCH)**

  A channel dedicated to one UE used in uplink or downlink.

To each transport channel, there is an associated Transport Format (for transport channels with a fixed or slow changing rate) or an associated Transport Format Set (for transport channels with fast changing rate). A Transport Format is defined as a combination of encodings, interleaving, bit rate and mapping onto physical channels (see [4] for details). A Transport Format Set is a set of Transport Formats. E.g., a variable rate DCH has a Transport Format Set (one Transport Format for each rate), whereas a fixed rate DCH has a single Transport Format.

5.2.2 L1 Functions

The physical layer performs the following main functions:

- Macrodiversity distribution/combining and soft handover execution;

- Error detection on transport channels and indication to higher layers;

- FEC encoding/decoding and interleaving/deinterleaving of transport channels;
- Multiplexing of transport channels and demultiplexing of coded composite transport channels;
- Rate matching;
- Mapping of coded composite transport channels on physical channels;
- Power weighting and combining of physical channels;
- Modulation and spreading/demodulation and despreading of physical channels;
- Frequency and time (chip, bit, slot, frame) synchronisation;
- Measurements and indication to higher layers (e.g. FER, SIR, interference power, transmit power, etc.);
- Closed-loop power control;
- RF processing;
- Support of timing advance on uplink channels (TDD only);
- Support of Uplink Synchronisation as defined in [12] (TDD only).

5.3 Layer 2 Services and Functions

5.3.1 MAC Services and Functions

This subclause provides an overview on services and functions provided by the MAC sublayer. A detailed description of the MAC protocol is given in [7].

5.3.1.1 MAC Services to upper layers

- **Data transfer**. This service provides unacknowledged transfer of MAC SDUs between peer MAC entities. This service does not provide any data segmentation. Therefore, segmentation/reassembly function should be achieved by upper layer.
- **Reallocation of radio resources and MAC parameters**. This service performs on request of RRC execution of radio resource reallocation and change of MAC parameters, i.e. reconfiguration of MAC functions such as change of identity of UE, change of transport format (combination) sets, change of transport channel type. In TDD mode, in addition, the MAC can handle resource allocation autonomously.
- **Reporting of measurements**. Local measurements such as traffic volume and quality indication are reported to RRC.

5.3.1.1.1 Logical channels

The MAC layer provides data transfer services on logical channels. A set of logical channel types is defined for different kinds of data transfer services as offered by MAC. Each logical channel type is defined by what type of information is transferred.

A general classification of logical channels is into two groups:

- Control Channels (for the transfer of control plane information);
- Traffic Channels (for the transfer of user plane information).

The configuration of logical channel types is depicted in Figure 3.

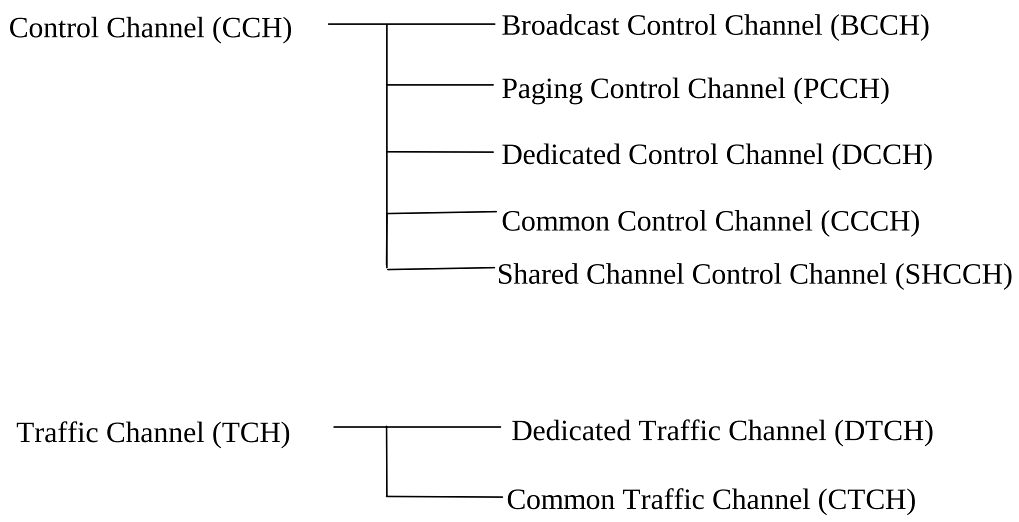


Figure 3: Logical channel structure

Control Channels

Control channels are used for transfer of control plane information only.

Broadcast Control Channel (BCCH)

A downlink channel for broadcasting system control information.

Paging Control Channel (PCCH)

A downlink channel that transfers paging information. This channel is used when the network does not know the location cell of the UE, or, the UE is in the cell connected state (utilising UE sleep mode procedures).

Common Control Channel (CCCH)

Bi-directional channel for transmitting control information between network and UEs. This channel is commonly used by the UEs having no RRC connection with the network and by the UEs using common transport channels when accessing a new cell after cell reselection.

Dedicated Control Channel (DCCH)

A point-to-point bi-directional channel that transmits dedicated control information between a UE and the network. This channel is established through RRC connection setup procedure.

Shared Channel Control Channel (SHCCH)

Bi-directional channel that transmits control information for uplink and downlink shared channels between network and UEs. This channel is for TDD only.

Traffic Channels

Traffic channels are used for the transfer of user plane information only.

Dedicated Traffic Channel (DTCH)

A Dedicated Traffic Channel (DTCH) is a point-to-point channel, dedicated to one UE, for the transfer of user information. A DTCH can exist in both uplink and downlink.

Common Traffic Channel (CTCH)

A point-to-multipoint unidirectional channel for transfer of dedicated user information for all or a group of specified UEs.

5.3.1.1.2 Mapping between logical channels and transport channels

5.3.1.1.2.1 Mapping in Uplink

In Uplink, the following connections between logical channels and transport channels exist:

- CCCH can be mapped to RACH;
- DCCH can be mapped to RACH;
- DCCH can be mapped to CPCH (in FDD mode only);
- DCCH can be mapped to DCH;
- DCCH can be mapped to USCH (in TDD mode only);
- DTCH can be mapped to RACH;
- DTCH can be mapped to CPCH (in FDD mode only);
- DTCH can be mapped to DCH;
- DTCH can be mapped to USCH (in TDD mode only);
- SHCCH can be mapped to RACH (in TDD mode only);
- SHCCH can be mapped to USCH (in TDD mode only).

5.3.1.1.2.2 Mapping in Downlink

In Downlink, the following connections between logical channels and transport channels exist:

- BCCH can be mapped to BCH;
- BCCH can be mapped to FACH;
- PCCH can be mapped to PCH;
- CCCH can be mapped to FACH;
- DCCH can be mapped to FACH;
- DCCH can be mapped to DSCH;
- DCCH can be mapped to HS-DSCH;
- DCCH can be mapped to DCH;
- DTCH can be mapped to FACH;
- DTCH can be mapped to DSCH;
- DTCH can be mapped to HS-DSCH;
- DTCH can be mapped to DCH;
- CTCH can be mapped to FACH;
- SHCCH can be mapped to FACH (in TDD mode only).
- SHCCH can be mapped to DSCH (in TDD mode only).

The mappings as seen from the UE and UTRAN sides are shown in Figure 4 and Figure 5 respectively.

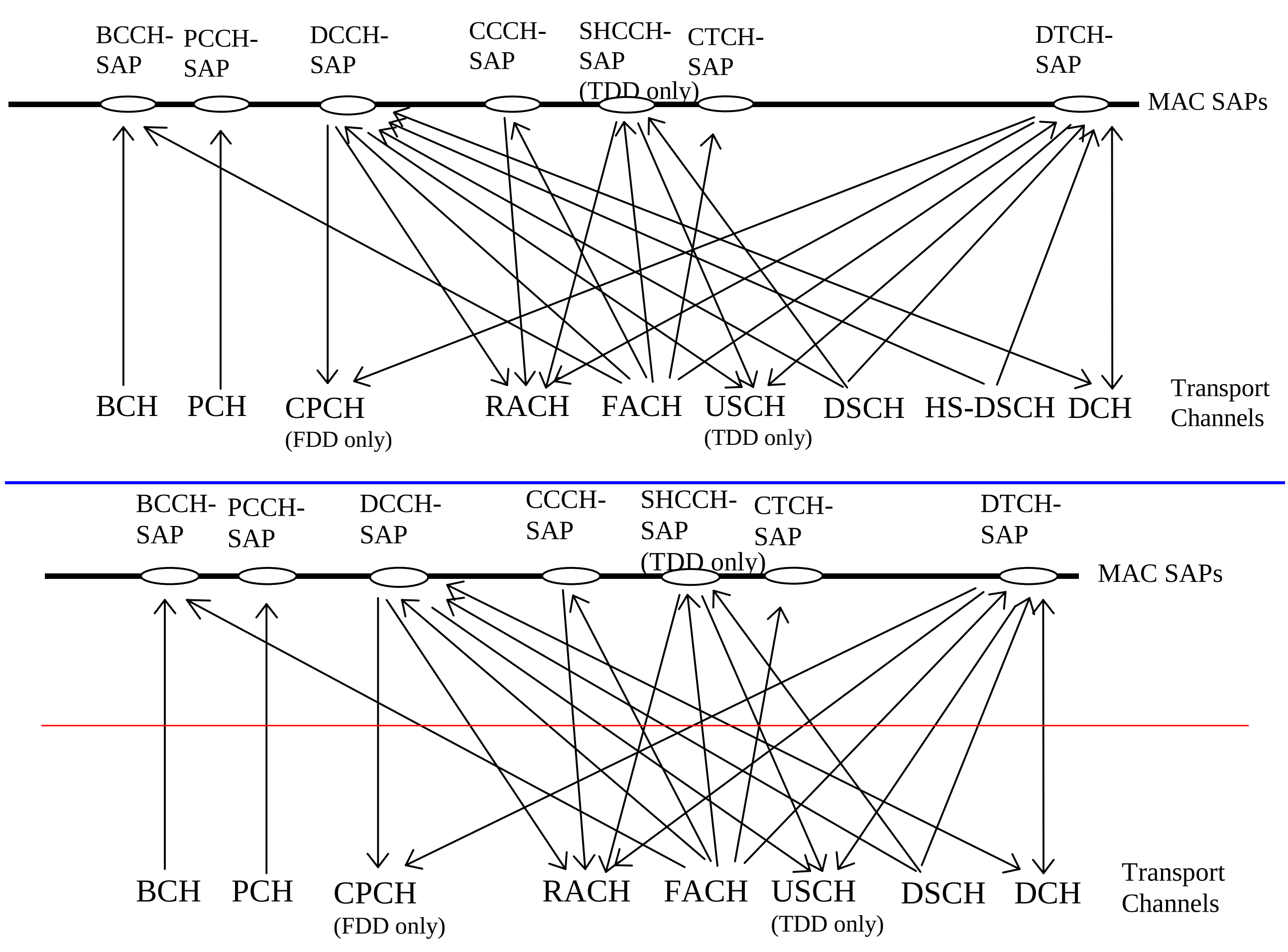


Figure 4: Logical channels mapped onto transport channels, seen from the UE side

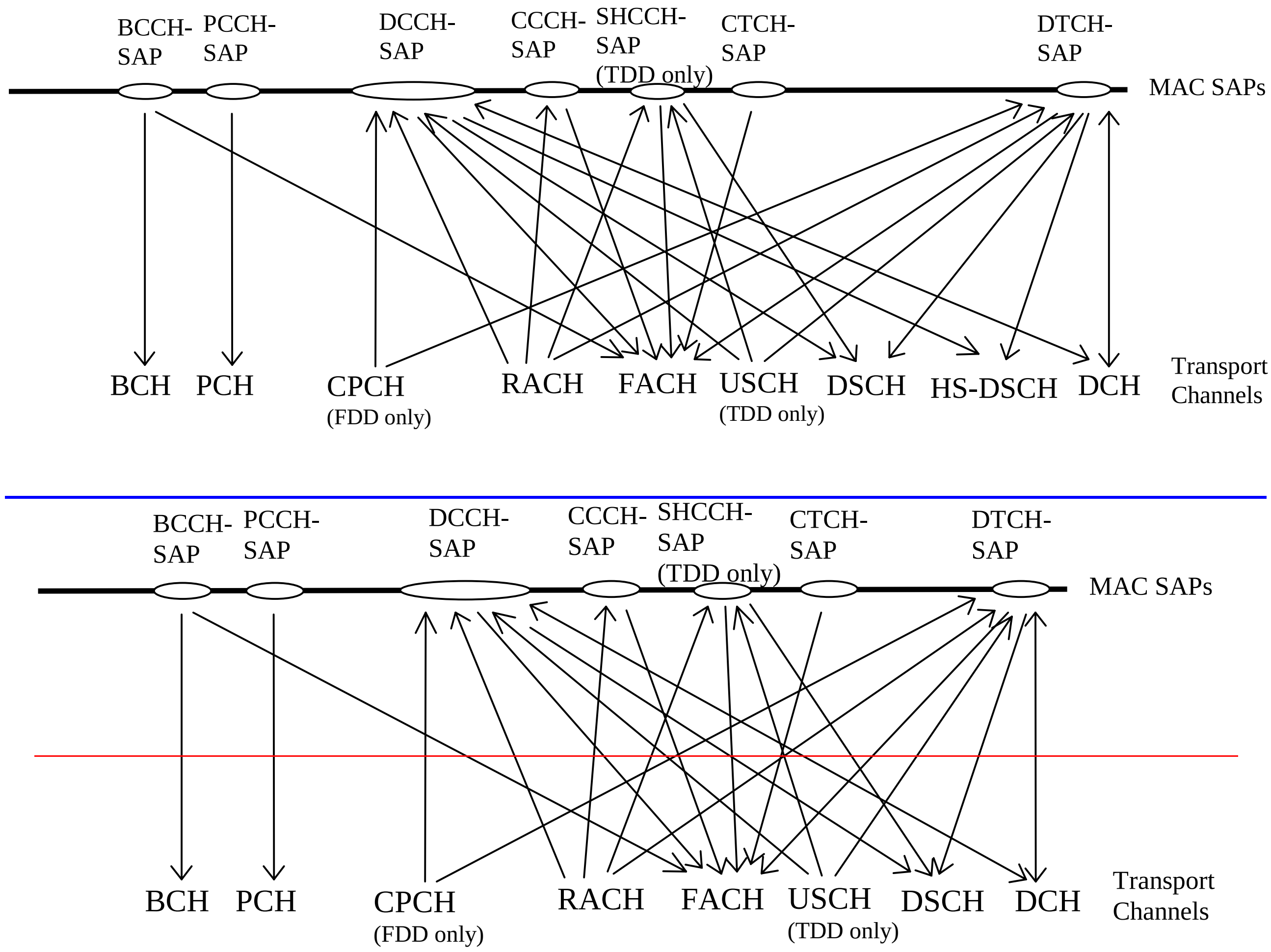


Figure 5: Logical channels mapped onto transport channels, seen from the UTRAN side

5.3.1.2 MAC functions

The functions of MAC include:

- **Mapping between logical channels and transport channels.** The MAC is responsible for mapping of logical channel(s) onto the appropriate transport channel(s).

- **Selection of appropriate Transport Format for each Transport Channel depending on instantaneous source rate**. Given the Transport Format Combination Set assigned by RRC, MAC selects the appropriate transport format within an assigned transport format set for each active transport channel depending on source rate**.** The control of transport formats ensures efficient use of transport channels.

- **Priority handling between data flows of one UE**. When selecting between the Transport Format Combinations in the given Transport Format Combination Set, priorities of the data flows to be mapped onto the corresponding Transport Channels can be taken into account. Priorities are e.g. given by attributes of Radio Bearer services and RLC buffer status. The priority handling is achieved by selecting a Transport Format Combination for which high priority data is mapped onto L1 with a "high bit rate" Transport Format, at the same time letting lower priority data be mapped with a "low bit rate" (could be zero bit rate) Transport Format. Transport format selection may also take into account transmit power indication from Layer 1.

- **Priority handling between UEs by means of dynamic scheduling**. In order to utilise the spectrum resources efficiently for bursty transfer, a dynamic scheduling function may be applied. MAC realises priority handling on common and shared transport channels. Note that for dedicated transport channels, the equivalent of the dynamic scheduling function is implicitly included as part of the reconfiguration function of the RRC sublayer.

NOTE: In the TDD mode the data to be transported are represented in terms of sets of resource units.

- **Identification of UEs on common transport channels**. When a particular UE is addressed on a common downlink channel, or when a UE is using the RACH, there is a need for inband identification of the UE. Since the MAC layer handles the access to, and multiplexing onto, the transport channels, the identification functionality is naturally also placed in MAC.

- **Multiplexing/demultiplexing of upper layer PDUs into/from transport blocks delivered to/from the physical layer on common transport channels**. MAC should support service multiplexing for common transport channels, since the physical layer does not support multiplexing of these channels.

- **Multiplexing/demultiplexing of upper layer PDUs into/from transport block sets delivered to/from the physical layer on dedicated transport channels**. The MAC allows service multiplexing for dedicated transport channels. This function can be utilised when several upper layer services (e.g. RLC instances) can be mapped efficiently on the same transport channel. In this case the identification of multiplexing is contained in the MAC protocol control information.

- **Traffic volume measurement**. Measurement of traffic volume on logical channels and reporting to RRC. Based on the reported traffic volume information, RRC performs transport channel switching decisions.

- **Transport Channel type switching.** Execution of the switching between common and dedicated transport channels based on a switching decision derived by RRC**.**

- **Ciphering**. This function prevents unauthorised acquisition of data. Ciphering is performed in the MAC layer for transparent RLC mode. Details of the security architecture are specified in [15].

- **Access Service Class selection for RACH and CPCH transmission**. The RACH resources (i.e. access slots and preamble signatures for FDD, timeslot and channelisation code for TDD) and CPCH resources (i.e. access slots and preamble signatures for FDD only) may be divided between different Access Service Classes in order to provide different priorities of RACH and CPCH usage. In addition it is possible for more than one ASC or for all ASCs to be assigned to the same access slot/signature space. Each access service class will also have a set of back-off parameters associated with it, some or all of which may be broadcast by the network. The MAC function applies the appropriate back-off and indicates to the PHY layer the RACH and CPCH partition associated to a given MAC PDU transfer.

- **HARQ functionality for HS-DSCH transmission.**

  The MAC-hs entity is responsible for establishing the HARQ entity in accordance with the higher layer configuration and handling all the tasks required to perform HARQ functionality. This functionality ensures delivery between peer entities by use of the ACK and NACK signalling between the peer entities.

- **Insequence delivery and assembly/dissassembly of higher layer PDUs on HS-DSCH.**

  The transmitting MAC-hs entity assembles the data block payload for the MAC-hs PDUs from the delivered MAC-d PDUs. The MAC-d PDUs that are assembled in any one MAC-hs PDU are the same priority, and from the same MAC-d flow.

  The receiving MAC-hs entity is then responsible for the reordering of the received data blocks according to the received TSN, per priority and MAC-d flow, and then disassembling the data block into MAC-d PDUs for insequence delivery to the higher layers.

5.3.2 RLC Services and Functions

This subclause provides an overview on services and functions provided by the RLC sublayer. A detailed description of the RLC protocol is given in [8].

5.3.2.1 Services provided to the upper layer

- **Transparent data transfer**. This service transmits upper layer PDUs without adding any protocol information, possibly including segmentation/reassembly functionality.

- **Unacknowledged data transfer**. This service transmits upper layer PDUs without guaranteeing delivery to the peer entity. The unacknowledged data transfer mode has the following characteristics:

  - Detection of erroneous data: The RLC sublayer shall deliver only those SDUs to the receiving upper layer that are free of transmission errors by using the sequence-number check function.
  - Immediate delivery: The receiving RLC sublayer entity shall deliver a SDU to the upper layer receiving entity as soon as it arrives at the receiver.
- **Acknowledged data transfer**. This service transmits upper layer PDUs and guarantees delivery to the peer entity. In case RLC is unable to deliver the data correctly, the user of RLC at the transmitting side is notified. For this service, both in-sequence and out-of-sequence delivery are supported. In many cases a upper layer protocol can restore the order of its PDUs. As long as the out-of-sequence properties of the lower layer are known and controlled (i.e. the upper layer protocol will not immediately request retransmission of a missing PDU) allowing out-of-sequence delivery can save memory space in the receiving RLC. The acknowledged data transfer mode has the following characteristics:
  - Error-free delivery: Error-free delivery is ensured by means of retransmission. The receiving RLC entity delivers only error-free SDUs to the upper layer.
  - Unique delivery: The RLC sublayer shall deliver each SDU only once to the receiving upper layer using duplication detection function.
  - In-sequence delivery: RLC sublayer shall provide support for in-order delivery of SDUs, i.e., RLC sublayer should deliver SDUs to the receiving upper layer entity in the same order as the transmitting upper layer entity submits them to the RLC sublayer.
  - Out-of-sequence delivery: Alternatively to in-sequence delivery, it shall also be possible to allow that the receiving RLC entity delivers SDUs to upper layer in different order than submitted to RLC sublayer at the transmitting side.
- **Maintenance of QoS as defined by upper layers.** The retransmission protocol shall be configurable by layer 3 to provide different levels of QoS. This can be controlled.
- **Notification of unrecoverable errors**. RLC notifies the upper layer of errors that cannot be resolved by RLC itself by normal exception handling procedures, e.g. by adjusting the maximum number of retransmissions according to delay requirements.

There is a single RLC connection per Radio Bearer.

5.3.2.2 RLC Functions

- **Segmentation and reassembly.** This function performs segmentation/reassembly of variable-length upper layer PDUs into/from smaller RLC PDUs. The RLC PDU size is adjustable to the actual set of transport formats.
- **Concatenation.** If the contents of an RLC SDU cannot be carried by one RLC PDU, the first segment of the next RLC SDU may be put into the RLC PDU in concatenation with the last segment of the previous RLC SDU.
- **Padding.** When concatenation is not applicable and the remaining data to be transmitted does not fill an entire RLC PDU of given size, the remainder of the data field shall be filled with padding bits.
- **Transfer of user data.** This function is used for conveyance of data between users of RLC services. RLC supports acknowledged, unacknowledged and transparent data transfer. QoS setting controls transfer of user data.
- **Error correction.** This function provides error correction by retransmission (e.g. Selective Repeat, Go Back N, or a Stop-and-Wait ARQ) in acknowledged data transfer mode.
- **In-sequence delivery of upper layer PDUs**. This function preserves the order of upper layer PDUs that were submitted for transfer by RLC using the acknowledged data transfer service. If this function is not used, out-of-sequence delivery is provided.
- **Duplicate Detection.** This function detects duplicated received RLC PDUs and ensures that the resultant upper layer PDU is delivered only once to the upper layer.
- **Flow control**. This function allows an RLC receiver to control the rate at which the peer RLC transmitting entity may send information.

- **Sequence number check.** This function is used in unacknowledged mode and guarantees the integrity of reassembled PDUs and provides a mechanism for the detection of corrupted RLC SDUs through checking sequence number in RLC PDUs when they are reassembled into a RLC SDU. A corrupted RLC SDU will be discarded.

- **Protocol error detection and recovery**. This function detects and recovers from errors in the operation of the RLC protocol.

- **Ciphering**. This function prevents unauthorised acquisition of data. Ciphering is performed in RLC layer for non-transparent RLC mode. Details of the security architecture are specified in [15].

- **Polling**. This function is used when an RLC transmitter requests a status report of an RLC receiver.

- **Status transmission**. An RLC receiver uses this function to transmit status reports to a RLC transmitter in order to inform about which PDUs that have been received and not received.

- **SDU discard**. This function allows an RLC transmitter to discharge RLC SDU from the buffer.

- **Estimated PDU Counter (EPC) mechanism**. This function is used for scheduling the retransmission of status reports in the receiver side.

- **Suspend/resume function**. Suspension and resumption of data transfer.

- **Stop/continue function**. Stop and continue of data transfer.

- **Re-establishment function**. Re-establish an acknowledged or unacknowledged mode RLC entity.

5.3.3 PDCP Services and Function

This subclause provides an overview on services and functions provided by the Packet Data Convergence Protocol (PDCP). A detailed description of the PDCP is given in [10].

5.3.3.1 PDCP Services provided to upper layers

- PDCP SDU delivery.

5.3.3.2 PDCP Functions

- **Header compression and decompression.** Header compression and decompression of IP data streams (e.g., TCP/IP and RTP/UDP/IP headers) at the transmitting and receiving entity, respectively. The header compression method is specific to the particular network layer, transport layer or upper layer protocol combinations e.g. TCP/IP and RTP/UDP/IP.

- **Transfer of user data.** Transmission of user data means that PDCP receives PDCP SDU from the NAS and forwards it to the RLC layer and vice versa.

- **Support for lossless SRNS relocation.** Maintenance of PDCP sequence numbers for radio bearers that are configured to support lossless SRNS relocation.

5.3.4 Broadcast/Multicast Control - Services and functions

This subclause provides an overview on services and functions provided by the BMC sublayer. A detailed description of the BMC protocol is given in [10].

5.3.4.1 BMC Services

The BMC-SAP provides a broadcast/multicast transmission service in the user plane on the radio interface for common user data in unacknowledged mode.

5.3.4.2 BMC Functions

- **Storage of Cell Broadcast Messages.**
  The BMC stores the Cell Broadcast messages received over the CBC-RNC interface for scheduled transmission.

- **Traffic volume monitoring and radio resource request for CBS.**
  At the UTRAN side, the BMC calculates the required transmission rate for Cell Broadcast Service based on the messages received over the CBC-RNC interface, and requests for appropriate CTCH/FACH resources from RRC.

- **Scheduling of BMC messages.**
  The BMC receives scheduling information together with each Cell Broadcast message over the CBC-RNC-interface. Based on this scheduling information, at the UTRAN side, BMC generates schedule messages and schedules BMC message sequences accordingly. At the UE side, BMC evaluates the schedule messages and indicates scheduling parameters to RRC, which are used by RRC to configure the lower layers for CBS discontinuous reception.

- **Transmission of BMC messages to UE.**
  This function transmits the BMC messages (Scheduling and Cell Broadcast messages) according to schedule.

- **Delivery of Cell Broadcast messages to upper layer (NAS).**
  This functions delivers the received Cell Broadcast messages to upper layer (NAS) in the UE. Only non-corrupted Cell Broadcast messages are delivered.

5.3.5 Data flows through Layer 2

Data flows through layer 2 are characterised by the applied data transfer modes on RLC (acknowledged, unacknowledged and transparent transmission) in combination with the data transfer type on MAC, i.e. whether or not a MAC header is required. The case where no MAC header is required is referred to as "transparent" MAC transmission. Acknowledged and unacknowledged RLC transmissions both require a RLC header. In unacknowledged transmission, only one type of unacknowledged data PDU is exchanged between peer RLC entities. In acknowledged transmission, both (acknowledged) data PDUs and control PDUs are exchanged between peer RLC entities.

The resulting different data flow cases are illustrated in Figures 6 - 9. On the level of detail presented here, differences between acknowledged and unacknowledged RLC transmission are not visible. Acknowledged and unacknowledged RLC transmission is shown as one case, referred to as non-transparent RLC.

NOTE: The term "transparent transmission" is used here to characterise the case where a protocol, MAC or RLC, does not require any protocol control information (e.g. header). In transparent transmission mode, however, some protocol functions may still be applied. In this case an entity of the respective protocol must be present even when the protocol is transparent. For the RLC protocol the segmentation/reassembly function may be applied. This can be performed without segmentation header when a given higher layer PDU fits into a fixed number of RLC PDUs to be transferred in a given transmission time interval. In this case segmentation/reassembly follows predefined rules known to sending and receiving RLC entities. For instance in the user plane, the segmentation/reassembly function is needed for the case of real-time services using high and possibly variable bit rates. For such services higher layer PDUs shall be segmented into reasonably sized RLC PDUs of fixed length allowing efficient FCS error detection on the physical layer. The higher layer PDU can be reassembled by simply concatenating all RLC PDUs included in a transport block set as implied by the used transport format.

Figure 6 and Figure 7 illustrate the data flows for transparent RLC with transparent and non-transparent MAC transmission, respectively.

Figure 8 and Figure 9 illustrate the data flows for non-transparent RLC with transparent and non-transparent MAC transmission, respectively.

A number of MAC PDUs shown in the figures shall comprise a transport block set. Note, however, that in all cases a transport block set must not necessarily match with a RLC SDU. The span of a transport block set can be smaller or larger than an RLC SDU.

Each mapping between a logical channel and a transport channel as defined in Figure 4 and Figure 5 in combination with the respective RLC transmission mode implies a certain data flow that is specified on a general level in the following.

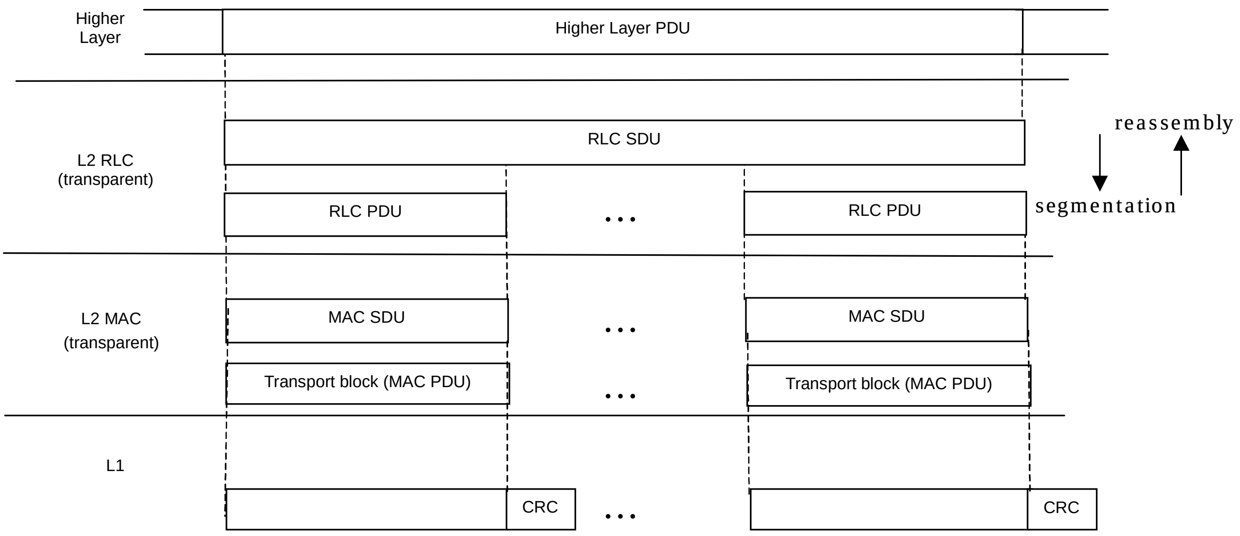


Figure 6: Data flow for transparent RLC and MAC

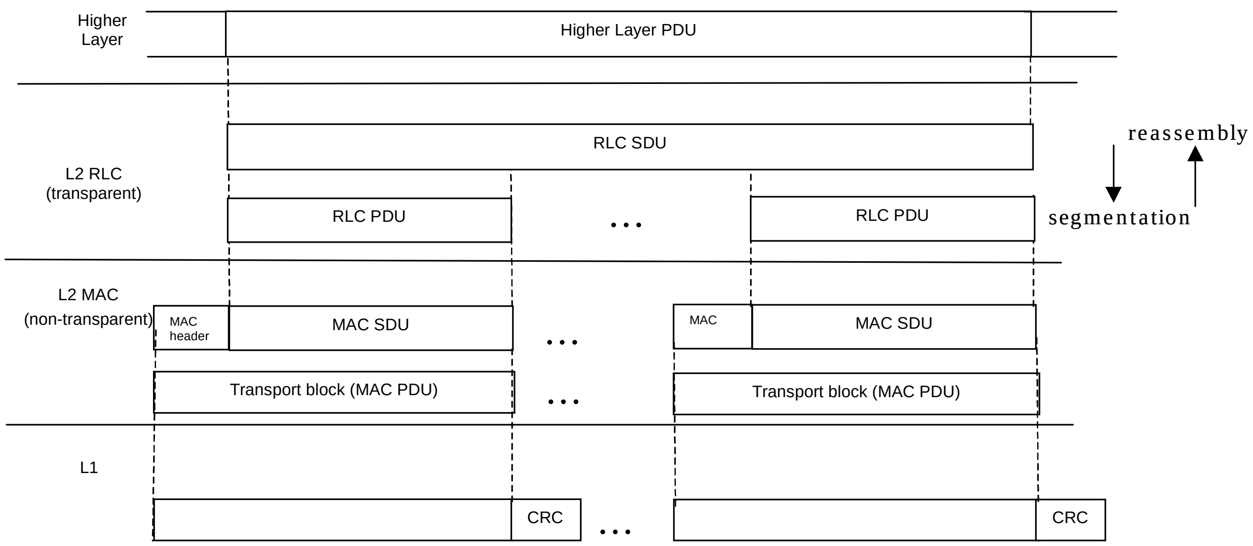


Figure 7: Data flow for transparent RLC and non-transparent MAC

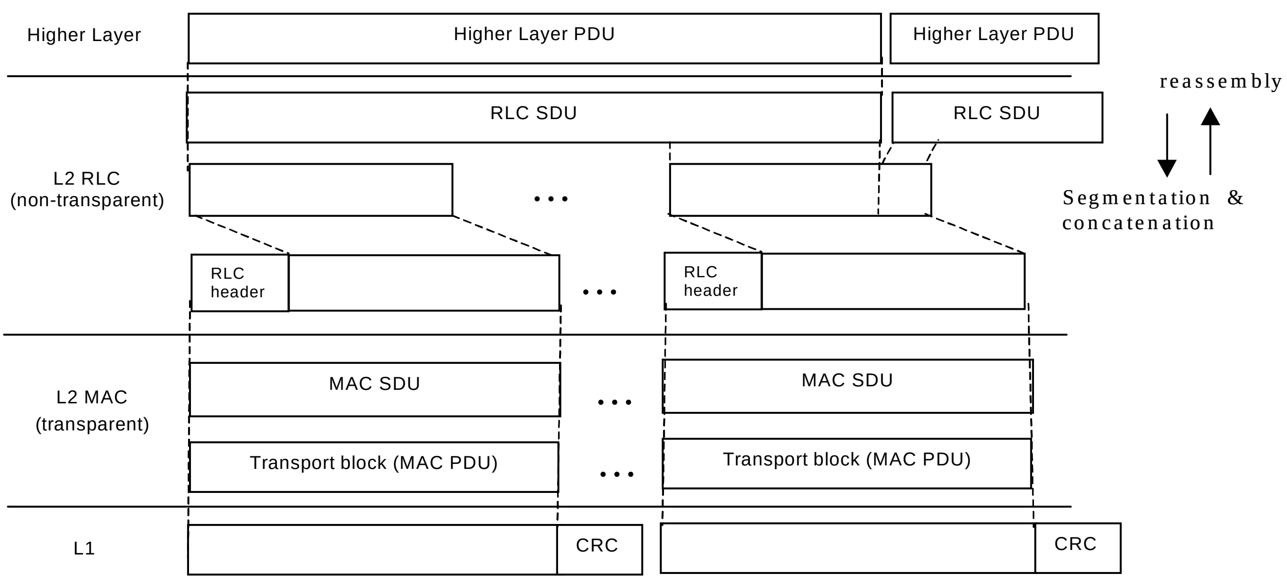


Figure 8: Data flow for non-transparent RLC and transparent MAC

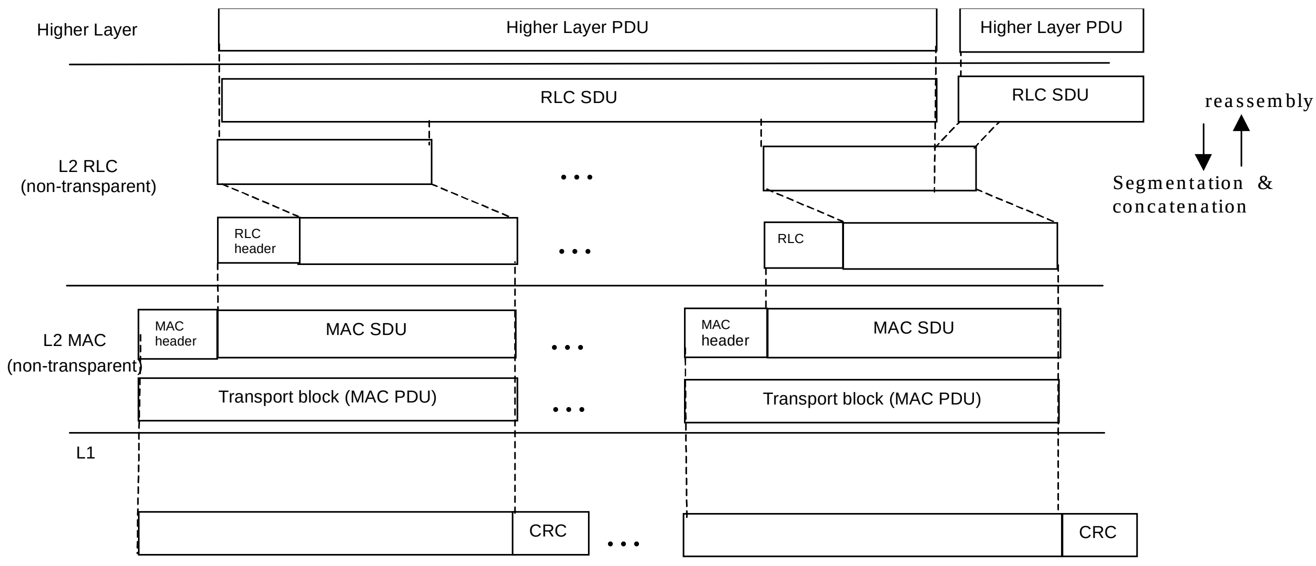


Figure 9: Data flow for non-transparent RLC and MAC

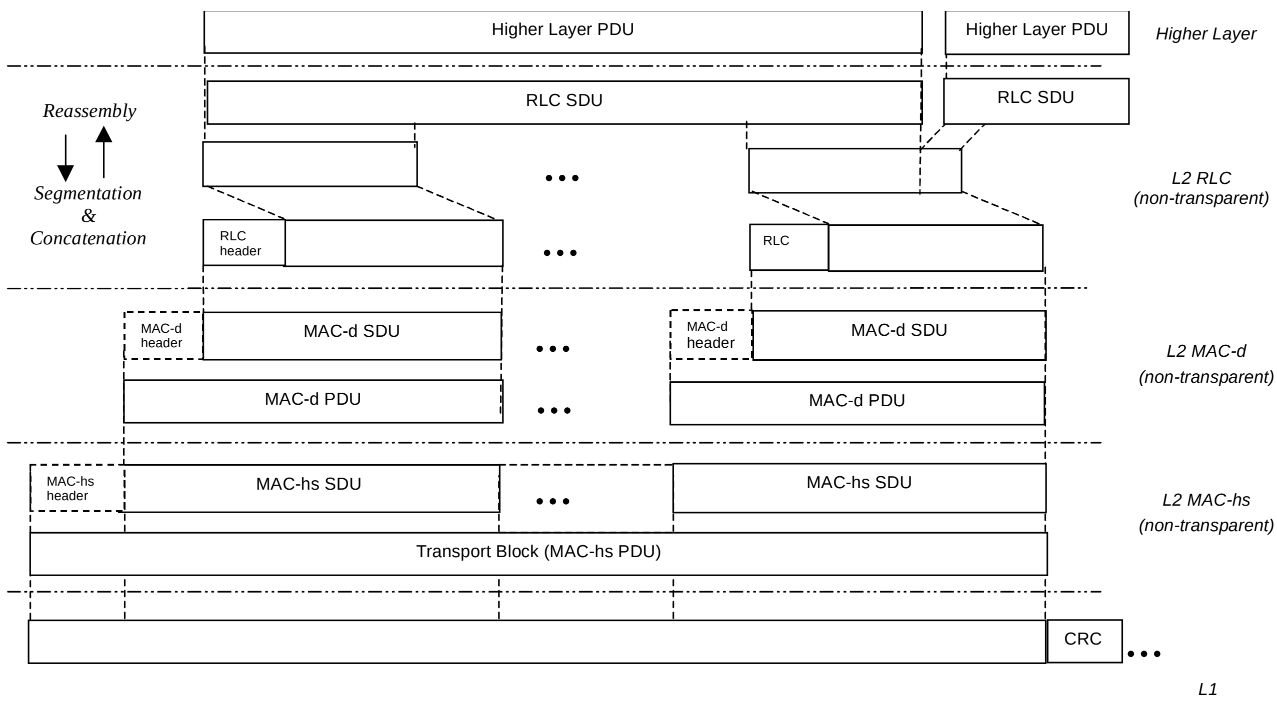


Figure x: Data flow for non-transparent RLC and MAC mapped to HS-DSCH

5.3.5.1 Data flow for BCCH mapped to BCH

All RRC PDUs transmitted on BCCH have a fixed length and fit into one RLC PDU (and, equivalently, MAC PDU, as defined by the transport format). No RLC header is needed, i.e. the transparent data transfer mode of RLC is applied.

No MAC header is needed since only one BCCH logical channel is mapped onto a BCH. Figure 6 is applicable.

5.3.5.2 Data flow for BCCH mapped to FACH

No RLC header is needed, i.e. the transparent data transfer mode of RLC is applied. A MAC header is required for identification of the logical channel carried by the FACH. The data flow shown in Figure 7 is applicable.

5.3.5.3 Data flow for PCCH mapped to PCH

No RLC or MAC header is needed, i.e. the data flow in Figure 6 is applicable.

5.3.5.4 Data flow for CCCH mapped to FACH/RACH

For CCCH, transparent transmission mode on RLC is employed on the uplink (when mapped to RACH). Unacknowledged transmission mode on RLC is employed on the downlink (when mapped to FACH). A MAC header is used for logical channel identification (CCCH, CTCH, SHCCH, DCCH, DTCH). If the transparent RLC transfer mode is applied, the data flow Figure 7 is applicable. If the unacknowledged RLC transfer mode is applied, the data flow Figure 9 is applicable.

5.3.5.5 Data flow for SHCCH mapped to USCH

For SHCCH mapped on USCH, transparent transmission mode on RLC is employed. A MAC header may be used for logical channel identification (SHCCH, DCCH, DTCH). When no MAC header is used, SHCCH must be the only channel mapped to USCH/DSCH. Depending on whether the MAC header is needed or not, either the data flow Figure 6 or Figure 7 is applicable.

5.3.5.6 Data flow for SHCCH mapped to FACH/RACH

For SHCCH, transparent transmission mode on RLC is employed on the uplink (when mapped to RACH). Unacknowledged transmission mode on RLC is employed on the downlink (when mapped to FACH). A MAC header may be used for logical channel identification (CCCH, CTCH, SHCCH, DCCH, DTCH). When no MAC header is used, SHCCH must be the only channel mapped to RACH/FACH. If the transparent RLC transfer mode is applied, depending on whether the MAC header is needed or not, either the data flow Figure 6 or Figure 7 is applicable. If the unacknowledged RLC transfer mode is applied, depending on whether the MAC header is needed or not, either the data flow Figure 8 or Figure 9 is applicable.

5.3.5.7 Data flow for DCCH mapped to FACH/RACH

For DCCH, both unacknowledged and acknowledged transmission mode on RLC is employed. A MAC header is mandatory for FACH/RACH carrying DCCH. The data flow shown in Figure 9 is applicable.

5.3.5.8 Data flow for DCCH mapped to DSCH

For DCCH, both unacknowledged and acknowledged transmission mode on RLC is employed. A MAC header is mandatory when DCCH is mapped to a DSCH for FDD mode, i.e. the data flow in Figure 9 is applicable. For TDD a MAC header is optional, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.9 Data flow for DCCH mapped to USCH

For DCCH, both unacknowledged and acknowledged transmission mode on RLC is employed. A MAC header is needed if DCCH and DTCH logical channels are multiplexed in MAC before mapping to a USCH, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.10 Data flow for DCCH mapped to CPCH

For DCCH mapped to CPCH, unacknowledged or acknowledged transmission modes on RLC are employed. The MAC header is needed for logical channel service multiplexing. Figure 9 is the applicable data flow to this case.

5.3.5.11 Data flow for DTCH (non-transparent RLC) mapped to FACH/RACH

Mapping to FACH/RACH implies a DTCH with acknowledged or unacknowledged transmission on RLC. A MAC header is mandatory for FACH/RACH when carrying DTCH. The data flow shown in Figure 9 is applicable.

5.3.5.12 Data flow for DTCH (non-transparent RLC) mapped to DSCH

Mapping to DSCH implies a DTCH with acknowledged or unacknowledged transmission on RLC. A MAC header is mandatory when DTCH is mapped to a DSCH in FDD mode, i.e. the data flow in Figure 9 is applicable. In TDD mode a MAC header is optional, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.13 Data flow for DTCH (non-transparent RLC) mapped to USCH

Mapping to USCH implies a DTCH with acknowledged or unacknowledged transmission on RLC. A MAC header is needed if DCCH and DTCH logical channels are multiplexed in MAC before mapping to a USCH, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.14 Data flow for DTCH (transparent RLC) mapped to DCH

Continuous DTCH data stream is segmented into transport blocks on RLC and mapped on a DCH transport channel on MAC. The transport block size is naturally implied by the data rate. Both RLC and MAC sublayers are transparent, i.e. no protocol control information is added, when no multiplexing of DTCH on MAC is applied. The data flow shown in Figure 6 is applicable. If multiplexing on MAC is performed, a MAC header is needed, and Figure 7 applies.

5.3.5.15 Data flow for DTCH (non-transparent RLC) mapped to DCH

In this case acknowledged or unacknowledged transmission on RLC is applied. A MAC header is needed only if multiple DTCH logical channels are multiplexed in MAC before mapping to a DCH, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.16 Data flow for DTCH (non-transparent RLC) mapped to CPCH.

This case requires both non-transparent RLC and MAC operations. The data flow shown in Figure 9 is applicable.

5.3.5.17 Data flow for DCCH mapped to DCH

In this case non-transparent or transparent transmission mode on RLC is applied. A MAC header is needed only if DCCH and DTCH logical channels are multiplexed in MAC before mapping to a DCH, i.e. either the data flow in Figure 8 or Figure 9 is applicable.

5.3.5.18 Data flow for CTCH mapped to FACH

For CTCH, unacknowledged transmission mode on RLC is employed. A MAC header is used for logical channel identification (CCCH, CTCH, DCCH, DTCH). The data flow shown in Figure 9 is applicable.

5.3.5.19 Data flow for DCCH mapped to HS-DSCH

For DCCH, both unacknowledged and acknowledged transmission mode on RLC is employed. A MAC header is mandatory when the DCCH is mapped to the HS-DSCH. i.e. the data flow in figure x is applicable.

5.3.5.20 Data flow for DTCH (non-transparent RLC) mapped to HS-DSCH

Mapping to DSCH implies a DTCH with acknowledged or unacknowledged transmission on RLC. A MAC header is mandatory when the DCCH is mapped to the HS-DSCH. i.e. the data flow in figure x is applicable.

5.3.6 Transport Channel and Logical Channel Numbering

The UE model for transport channel and logical channel numbering is defined by the following:

- For FACH transport channels:
  - A transport channel identity is associated with each FACH transport channel. Each identity is unique within the downlink FACHs mapped onto the same physical channel.
  - Transport channel identities can be allocated non sequentially.

  - Transport channel identity is not used to determine the radio bearer mapping. The transport channels that can be used are determined from the available physical channels.
  - Each downlink DCCH and DTCH has a unique logical channel identity.
- For RACH and CPCH transport channels:
  - A transport channel identity is associated with each RACH transport channel. Each identity is unique within the RACHs mapped onto the same PRACH.
  - A transport channel identity is associated with each CPCH transport channel. Each identity is unique within the CPCHs mapped onto the same CPCH set.
  - Transport channel identities can be allocated non sequentially.
  - Transport channel identity is not used to determine the radio bearer mapping. The transport channels that can be used are determined from the available physical channels.
  - Each uplink DCCH and DTCH has a unique logical channel identity.
- For downlink DCH and DSCH transport channels:
  - A transport channel identity is associated with each downlink DCH transport channel. Each identity is unique within the downlink DCHs configured in the UE;
  - Transport channel identities can be allocated non sequentially.
  - A transport channel identity is associated with each DSCH transport channel. Each identity is unique within the DSCHs configured in the UE;
  - A logical channel identity is associated with each logical channel that is multiplexed with other logical channels before being mapped to a transport channel. Each identity is unique within the logical channels mapped to the same transport channel.
  - A logical channel that is mapped to DCH and DSCH simultaneously has one logical channel identity.
- For HS-DSCH transport channels:
  - A logical channel identity is associated with each logical channel that is multiplexed with other logical channels before being mapped to a MAC-d flow. Each identity is unique within the logical channels mapped to the same MAC-d flow.
- A logical channel that is mapped to DCH and HS-DSCH simultaneously has one logical channel identity.
- For uplink DCH and USCH transport channels:
  - A transport channel identity is associated with each downlink DCH transport channel. Each identity is unique within the DCHs configured in the UE;
  - Transport channel identities can be allocated non sequentially.
  - A transport channel identity is associated with each USCH transport channel. Each identity is unique within the USCHs configured in the UE;
  - A logical channel identity is associated with each logical channel that is multiplexed with other logical channels before being mapped to a transport channel. Each identity is unique within the logical channels mapped to the same transport channel.

[*************NEXT SECTION**************]

5.6 Protocol termination

This subclause specifies in which node of the UTRAN the radio interface protocols are terminated, i.e. where within UTRAN the respective protocol services are accessible. Dashed lines indicate those protocols whose presence is dependent on the service provided to upper layers.

5.6.1 Protocol termination for DCH

Figure 11 and Figure 12 show the protocol termination for DCH for the control and user planes, respectively. The part of physical layer terminating in the Serving RNC is the topmost macro-diversity combining and splitting function for the FDD mode. If no macrodiversity applies, the physical layer is terminated in Node B.

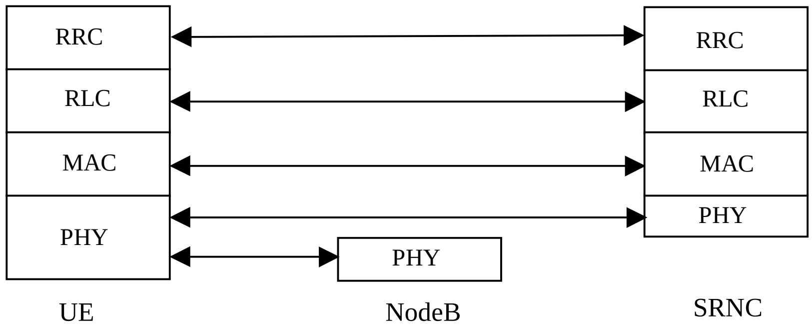


Figure 11: Protocol Termination for DCH, control plane

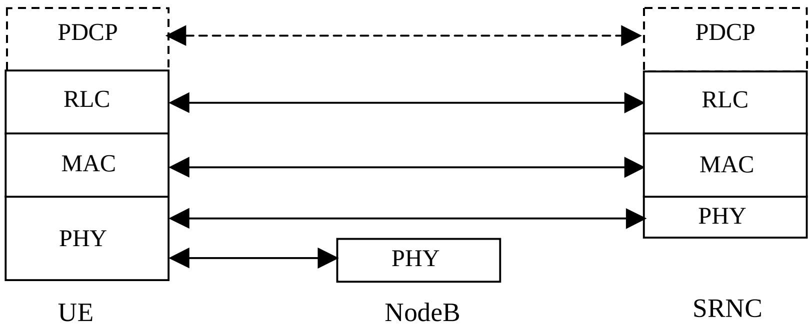


Figure 12: Protocol Termination for DCH, user plane

5.6.2 Protocol termination for RACH/FACH

Figure 13 and Figure 14 show the protocol termination for RACH/FACH for the control and user planes, respectively. Control plane termination refers to the case where RACH/FACH carry dedicated, common or shared control information (i.e. CCCH, DCCH or SHCCH, and in the downlink possibly also BCCH). User plane termination refers to the case where RACH/FACH carry dedicated user data (DTCH) or common user data (CTCH).

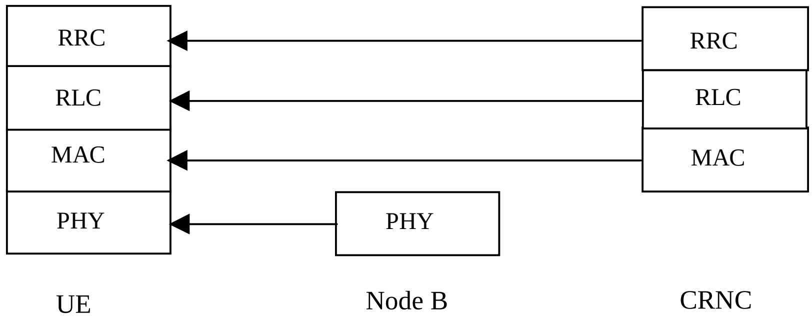
It is assumed that macrodiversity/soft handover is not applied for RACH/FACH. Therefore, the physical layer terminates in Node B. For RACH/FACH carrying DCCH, MAC is split between Controlling and Serving RNC. RLC, and in the C plane also RRC terminate in the Serving RNC. Since Iur can support common channel data streams, the users of that common channel can depend on different SRNCs. However, they depend on the same Controlling RNC. Therefore, for a given user, the Controlling RNC and the Serving RNC can be separate RNCs.

For FACH carrying BCCH, MAC, RLC and RRC are terminated in the CRNC.

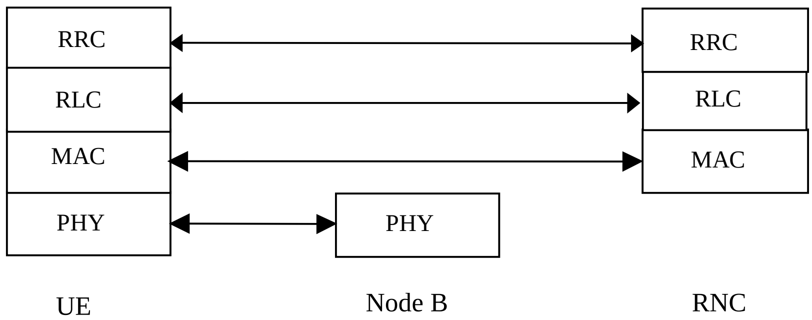
For RACH/FACH carrying SHCCH, MAC, RLC and RRC are terminated in the Controlling RNC (TDD only).

For RACH/FACH carrying CCCH, MAC, RLC and RRC are terminated in the RNC.

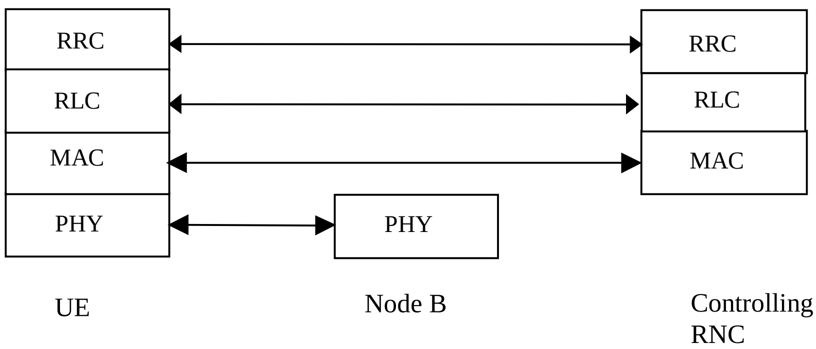
BCCH :



CCCH :



SHCCH:
(TDD only)



DCCH:

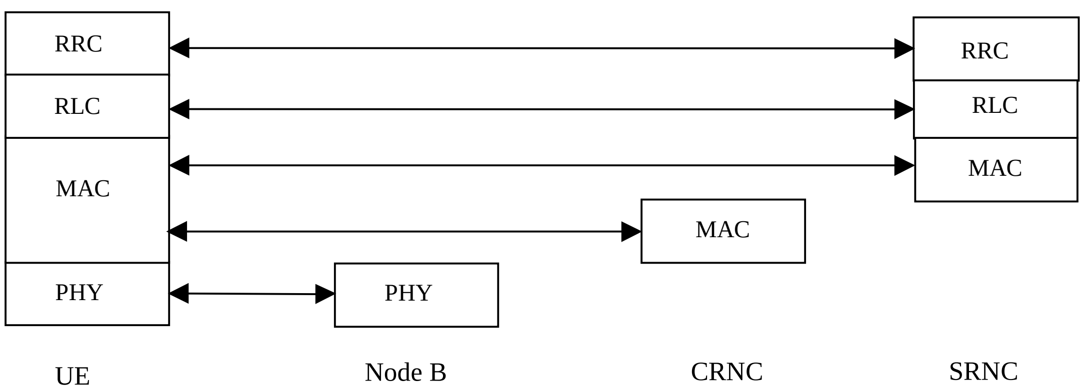
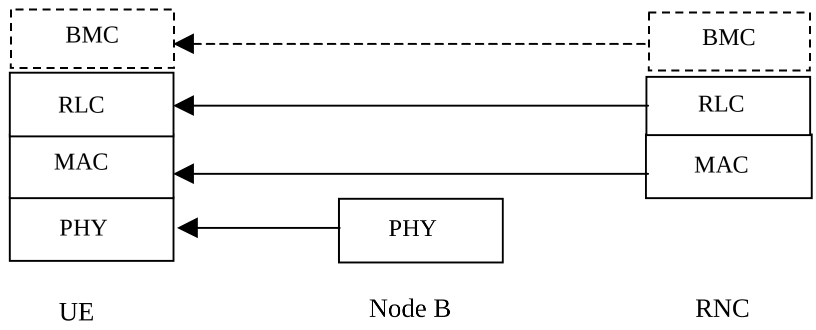


Figure 13: Protocol Termination for RACH/FACH, control plane

CTCH:



DTCH:

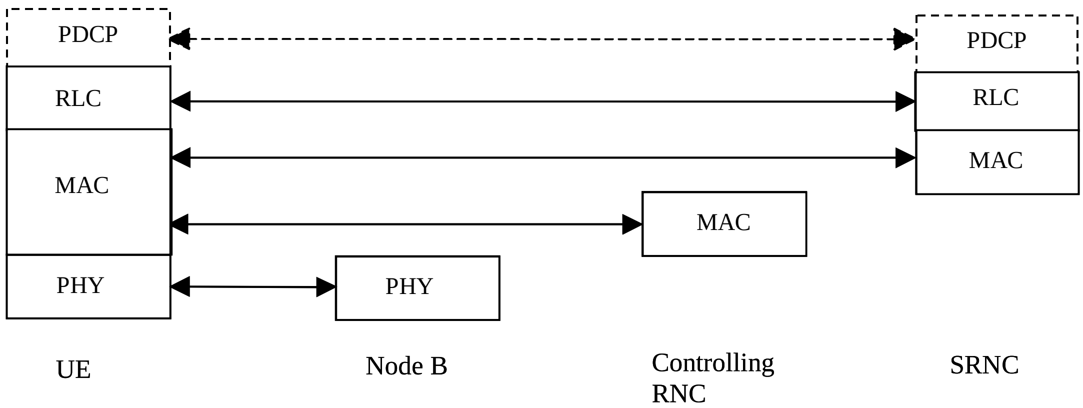


Figure 14: Protocol Termination for RACH/FACH, user plane

5.6.3 Void

5.6.4 Protocol termination for CPCH

The protocol termination for CPCH is identical to the termination for RACH. Figure 13 (for DCCH) presents the control plane protocol termination. Figure 14 presents the user plane protocol termination.

5.6.5 Protocol termination for DSCH

5.6.5.1 DSCH definition

The DSCH is a resource that exists in downlink only. It has only impact on the physical and transport channel levels, so there is no definition of shared channel in the logical channels provided by MAC.

The DSCH is a transport channel shared dynamically between several UEs. The DSCH is mapped to one or several physical channels such that a specified part of the downlink resources is employed. For the DSCH no macrodiversity is applied, i.e. a specific DSCH is transmitted in a single cell only.

The following two DSCH cases are supported in Release 99, in the following denoted as cases A and B:

- **Case A:** The DSCH is defined as an extension to DCH transmission. DSCH related resource allocation is signalled utilising the transport format indication field (TFI) that will be mapped to the TFCI of the associated DCH.

- **Case B:** The DSCH is defined as a shared downlink channel for which resource allocation is performed by RRC in Controlling RNC. The allocation messages, including UE identification, are transmitted on SHCCH, which is mapped on RACH/FACH. Several DSCH can be multiplexed on a CCTrCH in the physical layer, the transport formats of the DSCHs have to be selected from the transport format combination set of this CCTrCH. Each CCTrCH is mapped on one or more PDSCHs. If the transport format combination subset of a CCTrCH contains more than one transport format combination, a TFCI can be transmitted inside the PDSCH, or blind detection can be applied in the UE. This case is supported for TDD only.

NOTE: Cases A and B of DSCH can be employed concurrently for TDD (at the same time on a single PDSCH).

Interleaving for the DSCH may be applied over a multiplicity of radio frames. Nevertheless, here the basic case is considered where the interleaving is rectangular for a given MAC PDU, and equal to one radio frame (10 ms). The framing is synchronised on the SCH.

In every radio frame, one or several PDSCHs can be used in the downlink. Therefore, the DSCH supports code multiplexing. MAC multiplexing of different UEs shall not be applied within a radio frame, i.e. within one radio frame a PDSCH is assigned to a single UE. However, MAC multiplexing is allowed on a frame by frame basis, i.e. one PDSCH may be allocated to different UEs at each frame.

Transport blocks on the DSCH may be of constant size, so that the Transport Block Set may be derived from the code allocated to each UE on the DSCH. For case B, the transport format combination set can change with each transmission time interval.

5.6.5.2 Resource allocation and UE identification on DSCH

The principles of capacity allocation and UE identification on the DSCH are described in more detail below.

5.6.5.2.1 Case A (UE requires a downlink TFCI on a DPCCH)

The TFCI of the dedicated physical channel may carry the information that a given code of the DSCH must be listened to by the UE. Fast power control can be applied per code based on the dedicated physical control channel, DPCCH.

Alternatively, a UE may be requested on the DCH to listen to a DSCH for a given period of time, and to decode the data so that the address of the destination UE can be decoded. This does not require more TFCI values because signalling is done in layers 2 and 3.

5.6.5.2.2 Case B (UE requires a downlink SHCCH) (TDD only)

The information which physical downlink shared channels to listen to and when, is sent by RRC on the SHCCH logical channel, which is mapped on RACH and USCH/FACH and DSCH. The transmitted Layer 3 messages contain information about the used PDSCHs and the timing of the allocation.

5.6.5.3 Model of DSCH in UTRAN

Figure 15 captures the working assumption on the Downlink Shared Channel (DSCH). The two RLCs point to logical channel (DTCH) specific RLC-entities of specific users while MAC refers to the provision of MAC sublayer functions for all users.

The MAC sublayer of a DSCH is split between the Controlling RNC and SRNC. For a given user, the RLC sublayer is terminated in its SRNC. Since Iur can support DSCH data streams, the users on that DSCH can depend on different SRNCs. For a given user, the Controlling RNC and the Serving RNC can be separate RNCs. The MAC in the network takes care of mapping downlink data either to a common channel (FACH, not shown in this figure), or to a DCH and/or the DSCH.

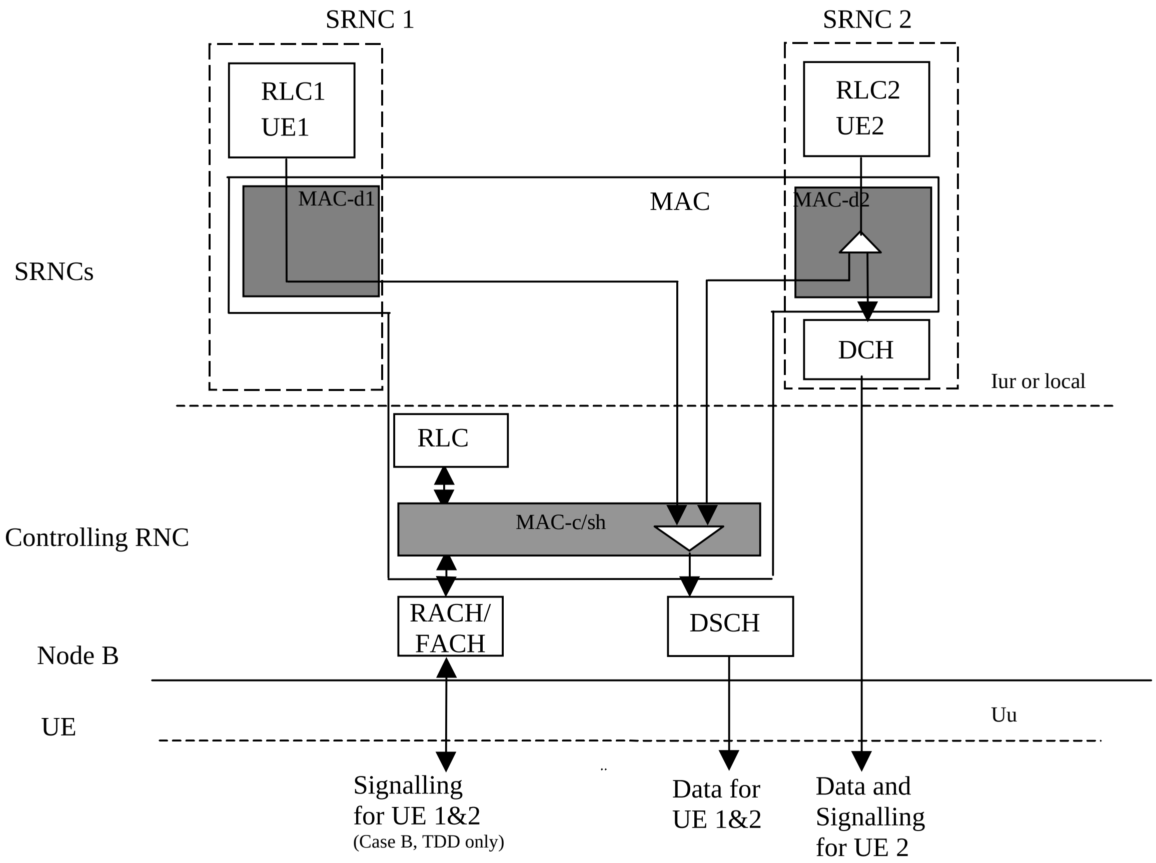


Figure 15: Model of downlink shared channel (DSCH) in UTRAN

5.6.5.4 Protocol termination

The protocol termination points for DSCH in control and user planes are presented in Figure 16 and Figure 17, respectively.

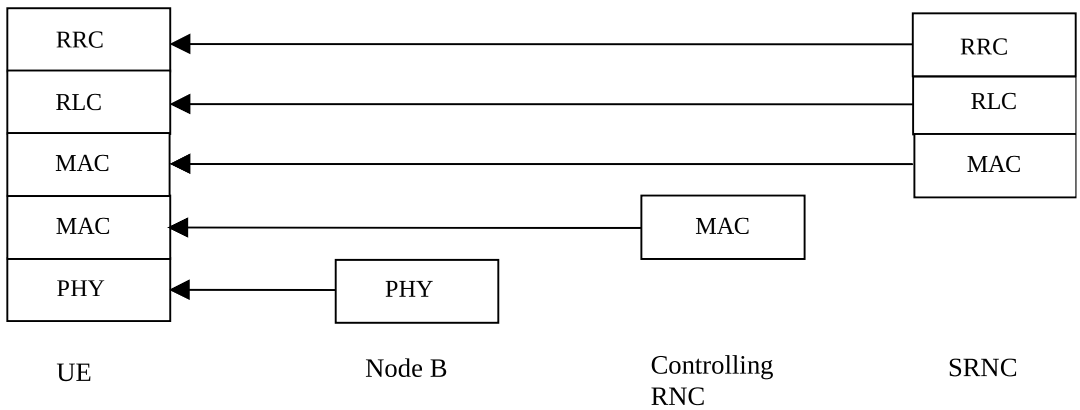


Figure 16: Protocol termination points for DSCH, control plane

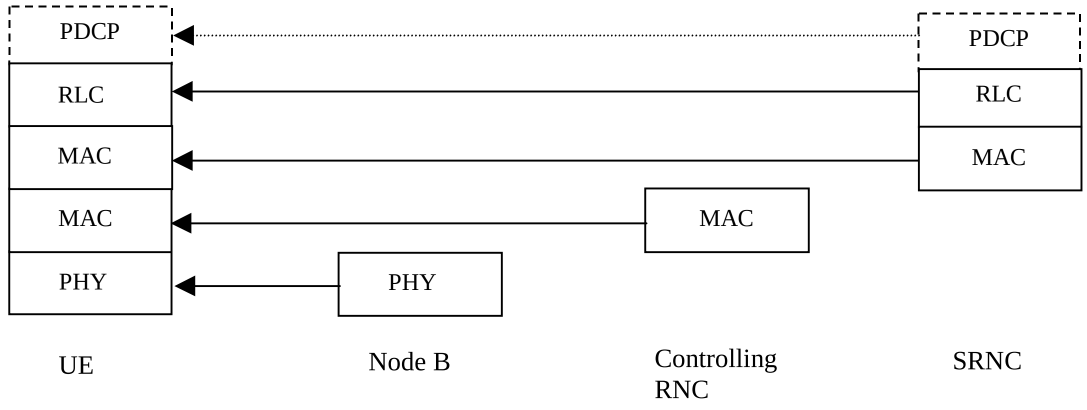


Figure 17: Protocol termination points for DSCH, user plane

5.6.6 Protocol termination for transport channel of type USCH

5.6.6.1 USCH definition

The USCH is only supported for TDD. It is a resource that exists in uplink only. It has only impact on the physical and transport channel levels, so there is no definition of shared channel in the logical channels provided by MAC.

The USCH is a transport channel shared dynamically between several UEs. The USCH is mapped to one or several physical channels such that a specified part of the uplink resources is employed.

The USCH is defined as a shared uplink channel for which resource allocation is performed by RRC in Controlling RNC. The allocation requests and allocation messages, including UE identification, are transmitted on SHCCH, which is mapped on RACH and USCH/FACH and DSCH. Several USCHs can be multiplexed on a CCTrCH in the physical layer, the transport formats of the USCHs have to be selected from the transport format combination set of this CCTrCH. Each CCTrCH is mapped on one or more PUSCHs. If the transport format combination subset of a CCTrCH contains more than one transport format combination, a TFCI can be transmitted inside the PUSCH, or blind detection can be applied in the Node B.

Interleaving for the USCH may be applied over a multiplicity of radio frames.

In every radio frame, one or several PUSCHs can be used in the uplink. Therefore, the USCH supports physical channel multiplexing. MAC multiplexing of different UEs shall not be applied within a radio frame, i.e. within one radio frame a PUSCH is assigned to a single UE. However, MAC multiplexing is allowed on a frame by frame basis, i.e. one PUSCH may be allocated to different UEs at each frame.

The transport format combination set on the USCH can change with each transmission time interval.

5.6.6.2 Resource allocation and UE identification on USCH

The information which physical uplink shared channels to transmit on and when is sent by RRC on the SHCCH logical channel, which is mapped on RACH and USCH/FACH and DSCH. The transmitted Layer 3 messages contain information about the assigned PUSCHs and the timing of the allocation.

5.6.6.3 Model of USCH in UTRAN

Figure 18 captures the working assumption on the Uplink Shared Channel (USCH). The two RLCs point to logical channel (DTCH) specific RLC-entities of specific users while MAC refers to the provision of MAC sublayer functions for all users.

The MAC sublayer of a USCH is split between the Controlling RNC and SRNC. For a given user, the RLC sublayer is terminated in its SRNC. Since Iur can support USCH data streams, the users on that USCH can depend on different SRNCs. For a given user, the Controlling RNC and the Serving RNC can be separate RNCs. The MAC in the network takes care of mapping uplink data either from a common channel (RACH, not shown in this figure), DCH or the USCH.

Allocations of uplink capacity are requested by the UEs and signalled to the UEs on the SHCCH (Shared channel control channel), which is mapped on RACH and USCH/FACH and DSCH.

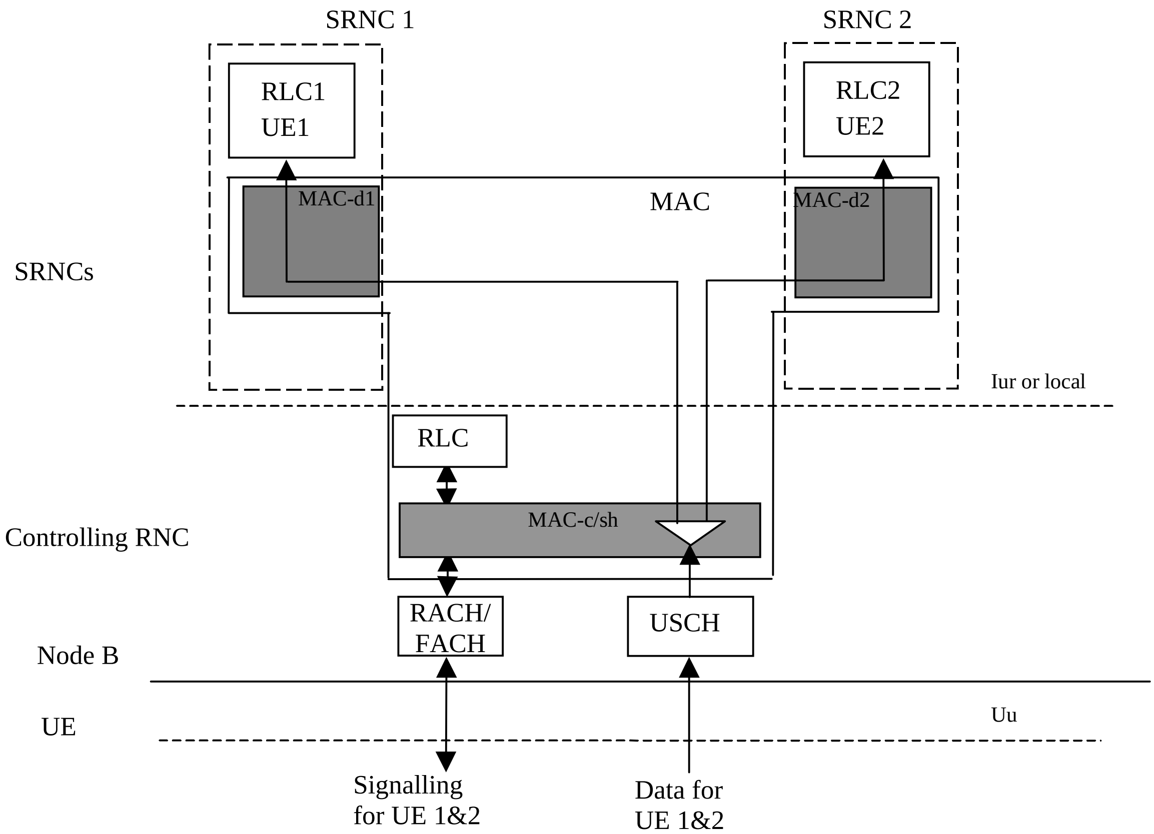


Figure 18: Model of uplink shared channel (USCH) in UTRAN (TDD only)

5.6.6.4 Protocol termination

The protocol termination points for USCH in control and user planes are presented in Figure 19 and Figure 20, respectively. The USCH is for TDD only.

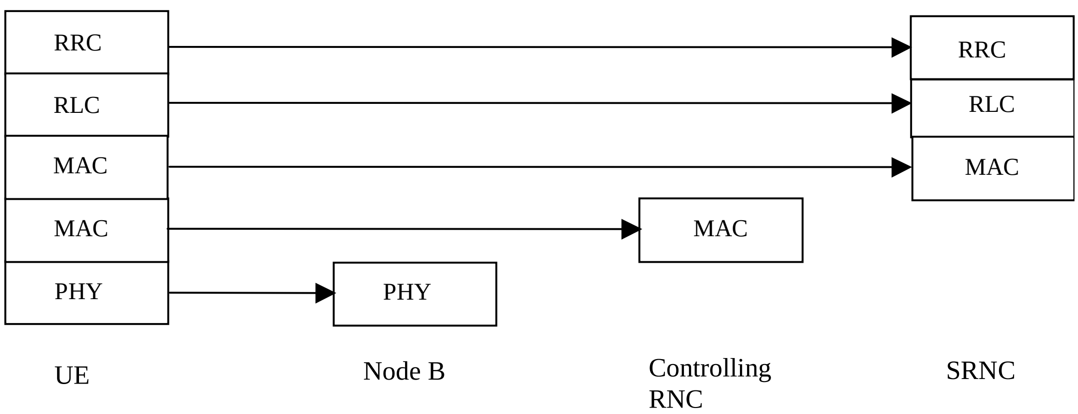


Figure 19: Protocol termination points for USCH, control plane (TDD only)

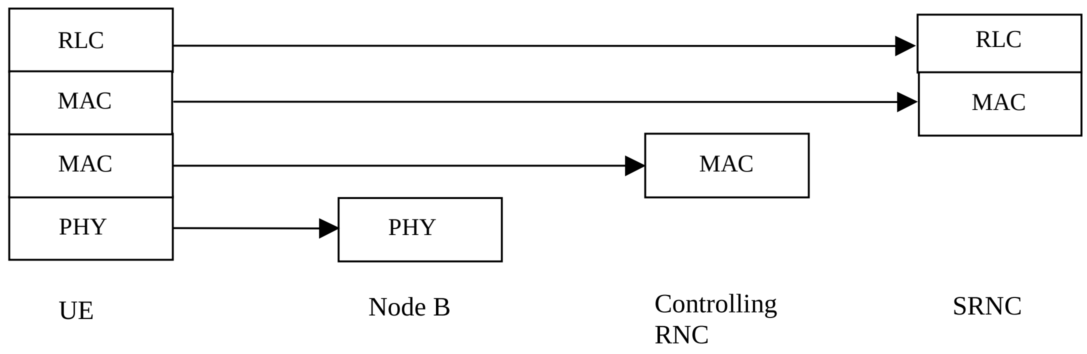


Figure 20: Protocol termination points for USCH, user plane (TDD only)

5.6.7 Protocol termination for transport channel of type BCH

System information on BCH can include information that is available only in Node B, and need to be updated very frequently (each 20-100 ms), such as uplink interference in the cell. Also, for the system information originating from the RNC, it is assumed that the updating of system information is at least one magnitude less (minutes) than the repetition frequency on the BCH (in the order of 1s). The system information originating from the CRNC should be sent transparently to Node B, which then handles the repetition. Protocol termination for the BCH shall therefore be distributed between the Node B and the CRNC, resulting in less signalling on Iub and lower processor load. Note that the RLC sublayer is transparent for this transport channel type.

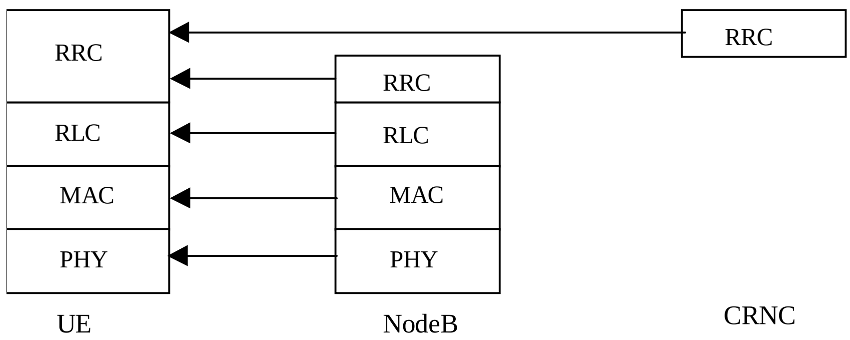


Figure 21: Protocol termination for BCH

5.6.8 Protocol termination for transport channel of type PCH

In order to enable co-ordinated scheduling between PCH and FACH/DSCH the corresponding MAC scheduling functions shall be allocated in the same node. MAC-c/sh is terminated in CRNC. A natural implication is that RLC and RRC also are terminated in CRNC.

Note that the RLC sublayer is transparent for this channel.

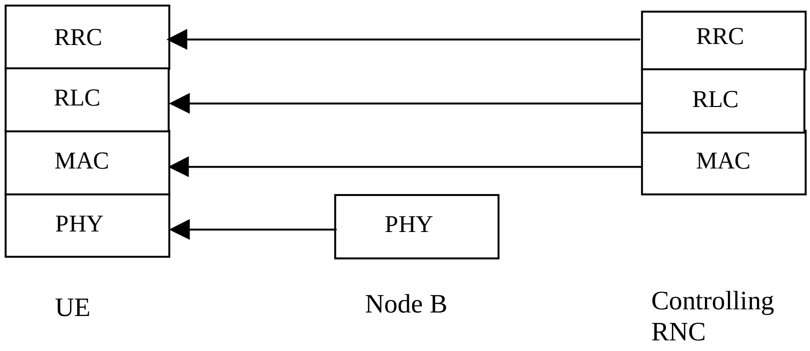


Figure 22: Protocol termination for PCH

5.6.9 Protocol termination for HS-DSCH

5.6.9.1 HS-DSCH definition

The HS-DSCH is a resource that exists in downlink only. It has only impact on the physical and transport channel levels, so there is no definition of shared channel in the logical channels provided by MAC.

The HS-DSCH is a transport channel for which a common pool of radio resources is shared dynamically between several UEs. The HS-DSCH is mapped to one or several physical channels such that a specified part of the downlink resources is employed. For the HS-DSCH no macrodiversity is applied, i.e. a specific HS-DSCH is transmitted in a single cell only.

- The HS-DSCH is defined as an extension to DCH transmission. A two-step signalling approach is used for indicating to a UE when it has been scheduled and then the necessary signalling information for the UE to decode the HS-PDSCH.

In every HS-DSCH TTI, one or several HS-PDSCHs can be used in the downlink. Therefore, the HS-DSCH supports code multiplexing. MAC multiplexing of different UEs shall not be applied within an HS-DSCH TTI, i.e. within one HS-DSCH TTI an HS-PDSCH is assigned to a single UE. However, MAC multiplexing is allowed on a TTI by TTI basis, i.e. one HS-PDSCH may be allocated to different UEs at each TTI.

5.6.9.2 Resource allocation and UE identification on HS-DSCH

A two-step signalling approach is used for individual resource allocation on the HS-DSCH.

~~The associated DPCH carries an HI field which signals the HS-SCCH the UE needs to decode from its configured HS-SCCH set.~~ For each HS-DSCH TTI, each HS-SCCH carries HS-DSCH related downlink signalling for one UE, along with a UE identity (via a UE specific CRC) that identifies the UE for which this information is necessary in order to decode the scheduled HS-PDSCH.

5.6.9.3 Protocol termination

The protocol termination points for HS-DSCH in the control and user planes are presented in Figure x and Figure y, respectively. For the user plane two configurations exist, a Configuration with MAC-c/sh and a Configuration without MAC-c/sh.

- Configuration with MAC-c/sh: In this case, the MAC-hs in Node B is located below MAC-c/sh in CRNC.

- Configuration without MAC-c/sh: In this case, the CRNC does not have any user plane function for the HS-DSCH. MAC-d in SRNC is located directly above MAC-hs in Node B, i.e. in the HS-DSCH user plane the SRNC is directly connected to the Node B, thus bypassing the DRNC.

Both configurations are transparent to both the UE and Node B. Figures y and ya show the respective user plane protocol architecture with termination points for the above two configurations.

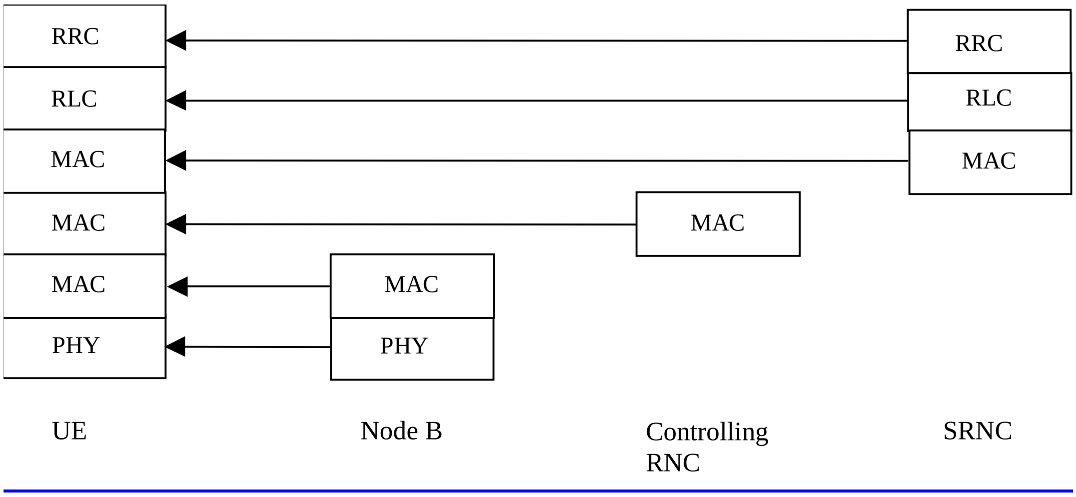


Figure x: Protocol termination points for HS-DSCH, control plane

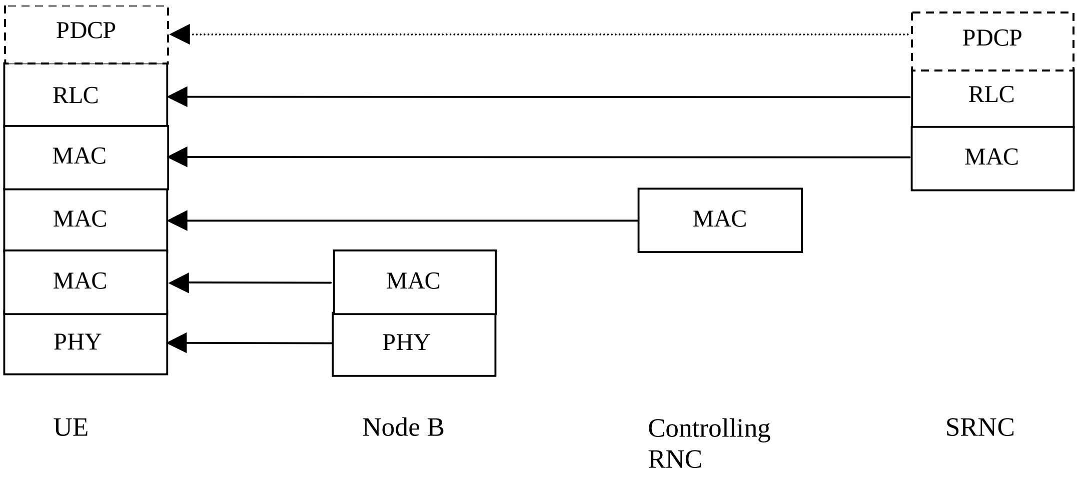


Figure y: Protocol termination points for HS-DSCH, user plane, Configuration with MAC-c/sh

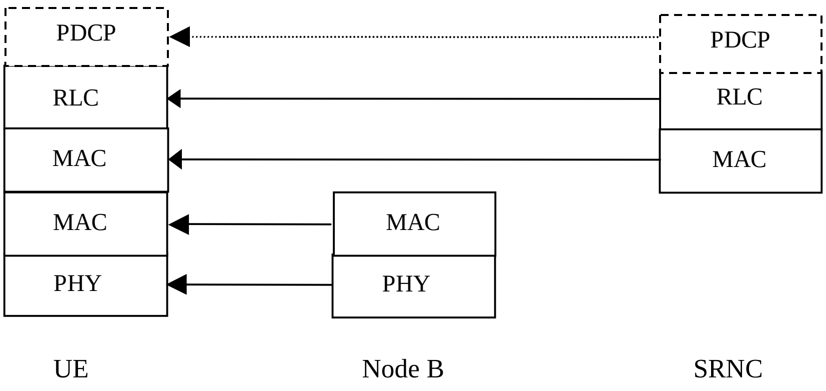


Figure ya: Protocol termination points for HS-DSCH, user plane, Configuration without MAC-c/sh

6 User Identification and RRC Connection Mobility

6.1 UE identification on the radio interface

A Radio Network Temporary Identity (RNTI) is used as an UE identifier on RACH/FACH, RACH+CPCH/FACH or, for FDD mode, also on DSCH by the MAC protocol, or on PCH by the RRC, when a RRC connection exists.

Definition of UE identifiers

Two types of RNTIs exist. One is used within the Serving RNC and it is denoted by Serving RNC RNTI (S-RNTI), the other is used within a cell controlled by a CRNC, when applicable, and it is denoted by Cell RNTI (C-RNTI).

S-RNTI is allocated for all UEs having a RRC connection. It is allocated by the Serving RNC and it is unique within the Serving RNC. S-RNTI is reallocated always when the Serving RNC for the RRC connection is changed and deallocated when the RRC connection is released.

In addition for each UE having an RRC connection, there is an identifier of its current serving RNC, which is denoted as SRNC identifier. The SRNC identifier together with S-RNTI is a unique identifier of the RRC connection within PLMN. The combination of SRNC identifier and S-RNTI is referred to as U-RNTI (UTRAN Radio Network Temporary Identity), which is used on the radio interface.

C-RNTI for an UE is allocated by a controlling RNC and it is unique within one cell controlled by the allocating CRNC. C-RNTI can be reallocated when a UE accesses a new cell with the cell update procedure.

Usage of UE identifiers

U-RNTI is allocated to an UE having a RRC connection. It identifies the UE within UTRAN and is used as a UE identifier in cell update, URA update, RRC connection reestablishment and (UTRAN originated) paging messages and associated responses on the radio interface. The SRNC identifier within the U-RNTI is used by the Controlling RNC to route the received uplink messages towards the Serving RNC.

C-RNTI is used as a UE identifier in all other DCCH/DTCH common channel messages on the radio interface.

NAS identifiers are used as the UE identifier in the initial access CCCH message on the radio interface.

6.2 UE connection to UTRAN

The different levels of UE connection to UTRAN are listed below:

- No signalling connection exist
  The UE has no relation to UTRAN, only to CN. For data transfer, a signalling connection has to be established.

- Signalling connection exist
  There is a RRC connection between UE and UTRAN. The UE position can be known on different levels:

  - UTRAN Registration Area (URA) level
    The UE position is known on UTRAN registration area level. URA is a specified set of cell, which can be identified on the BCCH.

  - Cell level
    The UE position is known on cell level. Different channel types can be used for data transfer:

    - Common transport channels (RACH, FACH, CPCH, DSCH, HS-DSCH);

    - Dedicated transport channels (DCH).

CR-Form-v5

CHANGE REQUEST

⌘	25.331	CR	1305	⌘ rev	r2	⌘	Current version:	4.3.0	⌘

*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:	⌘	Introduction of HSDPA
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	HSDPA-L23
Date:	⌘	February 18, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

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: ⌘ Inclusion of HSDPA features

Summary of change: ⌘

1. References and Abbreviations have been updated.
2. A new UE identity, H-RNTI, has been introduced to identify the UE when allocated a HS-DSCH in CELL-DCH - this is used by L1 in order to verify that the information on the HS-SCCH is in fact assigned to this UE.
3. The Procedure text for the RB control messages has been updated to include the action of removing the stored H-RNTI when transitioning to CELL-FACH.
4. The procedure for the IE "added or Reconfigured DL TrCH Information" has been updated to include the actions for the IEs "HS-DSCH Transport Format Set", HARQ Info" and "MAC-hs reset indicator".
5. The procedure for the IE "Deleted DL TrCH information" has been updated to reflect the actions necessary on receiving the IE "MAC-d flow identity".
6. The procedure for the IE " Downlink information for each radio link" to specify the actions on receiving the IE "HS-PDSCH radio link identifier".
7. The procedure for the IE " Downlink HS-PDSCH Information" and it's associated IEs "HS-SCCH Info" and "Measurement Feedback Info" has been added.
8. New IEs " Downlink HS-PDSCH Information", "H-RNTI", "HS-DSCH Transport Format Set", "HARQ Info", "MAC-hs reset indicator", "HS-PDSCH radio link identifier", "HS-SCCH Info", "Measurement Feedback Info" and "MAC-d flow identity" have been added to the Tabular in appropriate messages and relevant subclauses.
9. The ASN.1 has been updated.

Consequences if not approved:	⌘	No support for HSDPA in REL-5.

Clauses affected:	⌘	2, 3.2, 8.2.2.3 , 8.6.3.1, 8.6.3.1b (new), 8.6.4.8, 8.6.5.6, 8.6.5.6a (new), 8.6.5.6b (new), 8.6.5.8, 8.6.6.4, 8.6.6.g (new), 8.6.6.h (new), 8.6.6.j (new), 10.2.8, 10.2.22, 10.2.27, 10.2.30, 10.2.33, 10.2.50, 10.3.3.d (new), 10.3.3.25, 10.3.3.42, 10.3.3.a (new), 10.3.4.21, 10.3.5.1, 10.3.5.a (new), 10.3.5.b (new), 10.3.5.c (new), 10.3.5.4, 10.3.6.21, 10.3.6.a1 (new), 10.3.6.a2 (new), 10.3.6.b (new), 10.3.6.27, 10.3.6.91, 10.3.10, 13.4.8.0 (new)		
Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ 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.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 25.301: "Radio Interface Protocol Architecture".

[3] 3GPP TS 25.303: "Interlayer Procedures in Connected Mode".

[4] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[5] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".

[6] 3GPP TS 25.103: "RF parameters in support of RRM".

[7] 3GPP TS 25.215: "Physical layer – Measurements (FDD)".

[8] 3GPP TS 25.225: "Physical layer – Measurements (TDD)".

[9] 3GPP TS 25.401: "UTRAN overall description".

[10] 3GPP TS 25.402: "Synchronization in UTRAN; Stage 2".

[11] 3GPP TS 23.003: "Numbering, addressing and identification".

[12] ICD-GPS-200: "Navstar GPS Space Segment/Navigation User Interface".

[13] RTCM-SC104: "RTCM Recommended Standards for Differential GNSS Service (v.2.2)".

[14] 3GPP TR 25.921: "Guidelines and principles for protocol description and error handling".

[15] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[16] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".

[17] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[18] 3GPP TS 25.305: "Stage 2 Functional Specification of UE Positioning in UTRAN".

[19] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[20] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".

[21] 3GPP TS 25.101: "UE Radio Transmission and Reception (FDD)".

[22] 3GPP TS 25.102: "UE Radio Transmission and Reception (TDD)".

[23] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[24] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[25] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

[26] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[27] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".

[28] 3GPP TS 25.213: "Spreading and modulation (FDD)".

[29] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[30] 3GPP TS 25.221: "Physical channels and mapping of transport channels onto physical channels (TDD)".

[31] 3GPP TS 25.222: "Multiplexing and channel coding (TDD)".

[32] 3GPP TS 25.223: "Spreading and modulation (TDD)".

[33] 3GPP TS 25.224: "Physical Layer Procedures (TDD)".

[34] 3GPP TS 25.302: "Services provided by the physical layer ".

[35] 3GPP TS 25.306 "UE Radio Access Capabilities".

[36] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) Specification".

[37] 3GPP TS 25.324: "Broadcast/Multicast Control BMC".

[38] 3GPP TR 25.922: "Radio resource management strategies".

[39] 3GPP TR 25.925: "Radio interface for broadcast/multicast services".

[40] 3GPP TS 33.102: "3G Security; Security Architecture".

[41] 3GPP TS 34.108: "Common Test Environments for User Equipment (UE) Conformance Testing".

[42] 3GPP TS 34.123-2: "User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".

[43] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[44] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".

[45] 3GPP TS 45.005: "Radio transmission and reception".

[46] 3GPP TS 45.008: "Radio subsystem link control".

[47] ITU-T Recommendation X.680 (12/97) "Information Technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[48] ITU-T Recommendation X.681 (12/97) "Information Technology - Abstract Syntax Notation One (ASN.1): Information object specification".

[49] ITU-T Recommendation X.691 (12/97) "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".

[50] 3GPP TS 31.102: "Characteristics of the USIM Application".

[51] 3GPP TS 25.308: "High Speed Downlink Packet Access (HSDPA): Overall Description; Stage 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACK	Acknowledgement
AICH	Acquisition Indicator CHannel
AM	Acknowledged Mode
AS	Access Stratum
ASC	Access Service Class
ASN.1	Abstract Syntax Notation.1
BCCH	Broadcast Control Channel
BCFE	Broadcast Control Functional Entity
BER	Bit Error Rate
BLER	BLock Error Rate
BSS	Base Station Sub-system
CCCH	Common Control Channel
CCPCH	Common Control Physical CHannel
CH	Conditional on history
CM	Connection Management
CN	Core Network
CPCH	Common Packet CHannel
C-RNTI	Cell RNTI
CTCH	Common Traffic CHannel
CTFC	Calculated Transport Format Combination
CV	Conditional on value
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCFE	Dedicated Control Functional Entity
DCH	Dedicated Channel
DC-SAP	Dedicated Control SAP
DGPS	Differential Global Positioning System
DL	Downlink
DRAC	Dynamic Resource Allocation Control
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Access Channel
FDD	Frequency Division Duplex
FFS	For Further Study
GC-SAP	General Control SAP
HCS	Hierarchical Cell Structure
HFN	Hyper Frame Number
H-RNTI	HS-DSCH RNTI
HS-DSCH	High Speed Downlink Shared Channel
ID	Identifier
IDNNS	Intra Domain NAS Node Selector
IE	Information element
IETF	Internet Engineering Task Force
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ISCP	Interference on Signal Code Power
L1	Layer 1
L2	Layer 2

L3	Layer 3
LAI	Location Area Identity
MAC	Media Access Control
MCC	Mobile Country Code
MD	Mandatory default
MM	Mobility Management
MNC	Mobile Network Code
MP	Mandatory present
NAS	Non Access Stratum
Nt-SAP	Notification SAP
NW	Network
OP	Optional
PCCH	Paging Control Channel
PCH	Paging Channel
PDCP	Packet Data Convergence Protocol
PDSCH	Physical Downlink Shared Channel
PDU	Protocol Data Unit
PLMN	Public Land Mobile Network
PNFE	Paging and Notification Control Functional Entity
PRACH	Physical Random Access CHannel
P-TMSI	Packet Temporary Mobile Subscriber Identity
PUSCH	Physical Uplink Shared Channel
QoS	Quality of Service
RAB	Radio access bearer
RACH	Random Access CHannel
RAI	Routing Area Identity
RAT	Radio Access Technology
RB	Radio Bearer
RFE	Routing Functional Entity
RL	Radio Link
RLC	Radio Link Control
RNC	Radio Network Controller
RNTI	Radio Network Temporary Identifier
RRC	Radio Resource Control
RSCP	Received Signal Code Power
RSSI	Received Signal Strength Indicator
SAP	Service Access Point
SCFE	Shared Control Function Entity
SCTD	Space Code Transmit Diversity
SF	Spreading Factor
SHCCH	Shared Control Channel
SIR	Signal to Interference Ratio
S-RNTI	SRNC - RNTI
SSDT	Site Selection Diversity Transmission
TDD	Time Division Duplex
TF	Transport Format
TFCS	Transport Format Combination Set
TFS	Transport Format Set
TM	Transparent Mode
TME	Transfer Mode Entity
TMSI	Temporary Mobile Subscriber Identity
Tr	Transparent
Tx	Transmission
UE	User Equipment
UL	Uplink
UM	Unacknowledged Mode
URA	UTRAN Registration Area
U-RNTI	UTRAN-RNTI
USCH	Uplink Shared Channel
UTRAN	Universal Terrestrial Radio Access Network

8.2 Radio Bearer control procedures

8.2.1 Radio bearer establishment

See subclause 8.2.2 Reconfiguration procedures.

8.2.2 Reconfiguration procedures

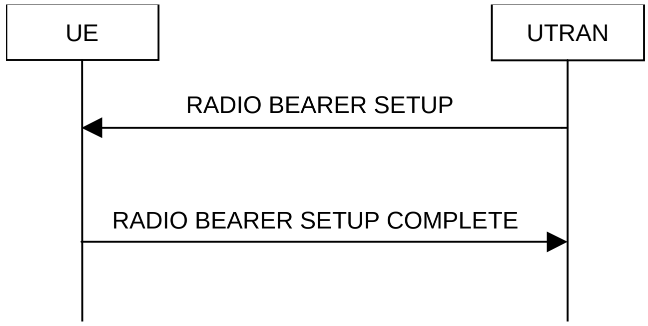


Figure 8.2.2-1: Radio Bearer Establishment, normal case

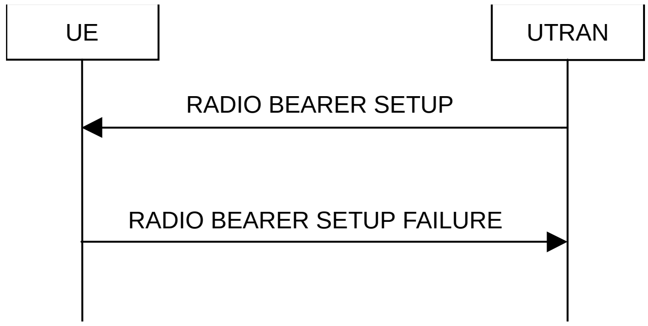


Figure 8.2.2-2: Radio Bearer Establishment, failure case

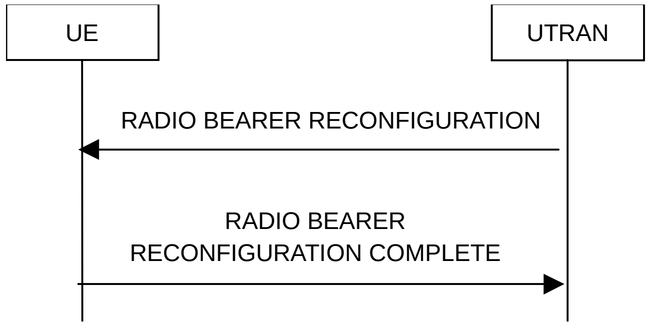


Figure 8.2.2-3: Radio bearer reconfiguration, normal flow

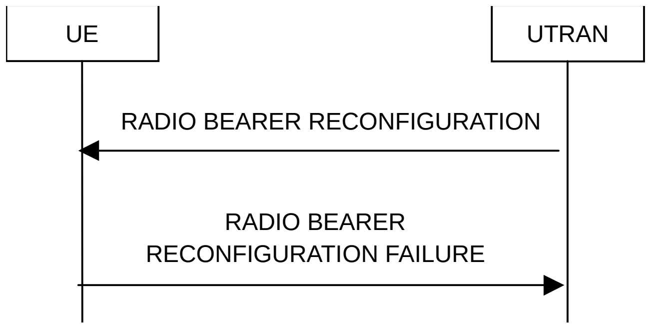


Figure 8.2.2-4: Radio bearer reconfiguration, failure case

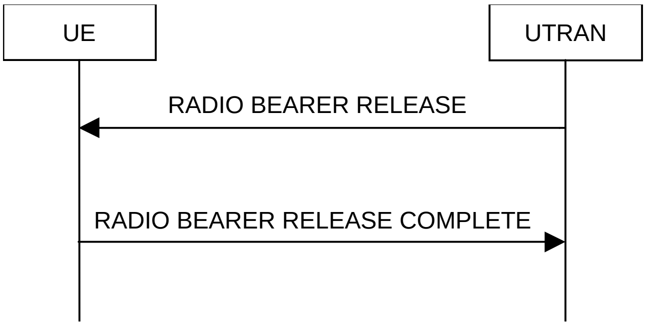


Figure 8.2.2-5: Radio Bearer Release, normal case

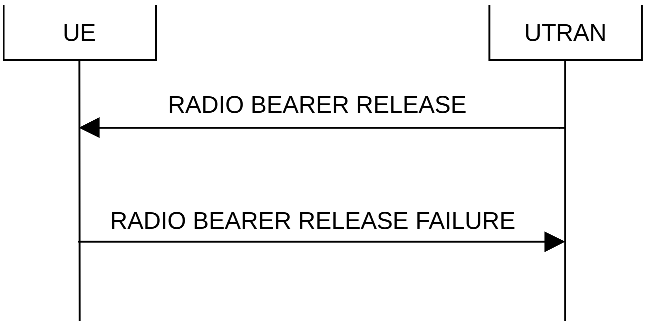


Figure 8.2.2-6: Radio Bearer Release, failure case

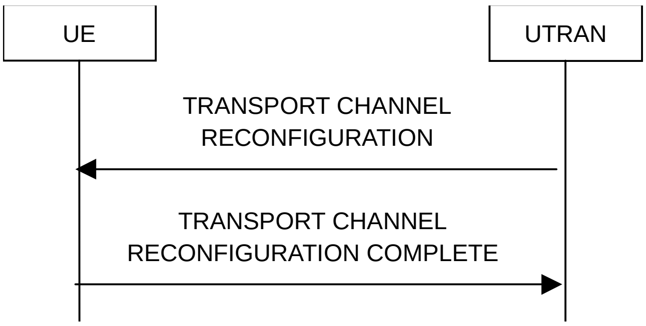


Figure 8.2.2-7: Transport channel reconfiguration, normal flow

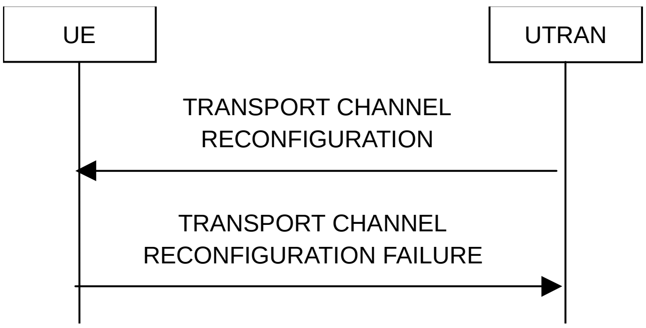


Figure 8.2.2-8: Transport channel reconfiguration, failure case

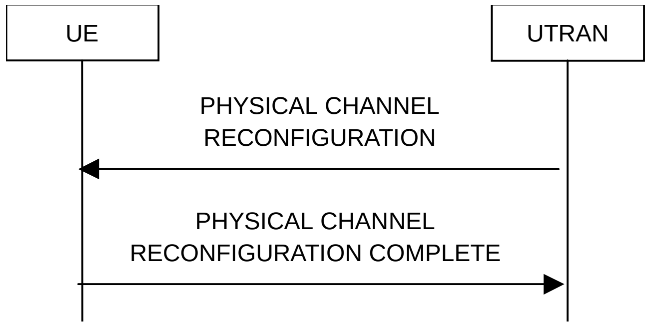


Figure 8.2.2-9: Physical channel reconfiguration, normal flow

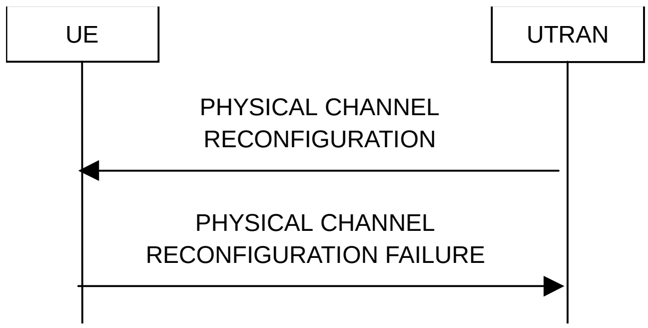


Figure 8.2.2-10: Physical channel reconfiguration, failure case

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 "Uplink DPCH Info" is absent, not change its current UL Physical channel configuration;
- if the IE "Downlink information for each radio link" 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.
- remove any H-RNTI stored;
- clear the variable H_RNTI;
- 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;
  - 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 "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 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" and specify a CFN value 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;

- remove any H-RNTI stored;

- clear the variable H_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 IE "UTRAN DRX cycle length coefficient" is not included in the same message:

  - set the variable INVALID_CONFIGURATION to TRUE.

- 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.

8.6.3 UE information elements

8.6.3.1 Activation time

If the UE receives a message in which presence is needed for the IE "Activation time", and the value is other than the default value "Now", the UE shall:

- if the frame boundary immediately before the frame with the CFN (Connection Frame Number) value indicated by the IE "Activation Time" is at the TTI boundary common to all the transport channels that are multiplexed onto the same CCTrCh including any transport channel which is added, reconfigured or has been removed:
  - select that frame boundary as the activation time T.
- else:
  - select the next TTI boundary, which is common to all the transport channels that are multiplexed onto the same CCTrCh including any transport channel which is added, reconfigured or has been removed, after the frame with the CFN (Connection Frame Number) value indicated by the IE "Activation Time", as the activation time T.
- at the activation time T:
  - for a physical channel reconfiguration caused by the received message:
    - release the physical channel configuration, which was present before T;
    - initiate the establishment of the physical channel configuration as specified for the physical channel information elements in the received message as specified elsewhere.
  - for actions, other than a physical channel reconfiguration, caused by the received message:
    - perform the actions for the information elements in the received message as specified elsewhere.

If the UE receives a message in which presence is needed for the IE "Activation time", and the value is the default value "Now", the UE shall:

- choose an activation time T as soon as possible after the reception of the message, respecting the performance requirements in subclause 13.5;
- at the activation time T:
  - perform the actions for the information elements in the received message as specified elsewhere.

If the UE receives a message that includes the configuration or reconfiguration of a HS-DSCH transport channel, the IE "Activation time" indicates the frame boundary at which the UE shall:

- start or stop monitoring the assigned HS-SCCH(s) according to the new configuration received in this message.

8.6.3.1a CN domain specific DRX cycle length coefficient

The UE updates CN domain specific DRX cycle length coefficient as specified in [4]. The UE shall use it to calculate the CN domain specific DRX cycle length, according to the following:

- set k to the value of the IE "CN domain specific DRX cycle length coefficient".
- store the result of MAX(2^k, PBP), where PBP is the Paging Block Periodicity, as the CN domain specific DRX cycle length for the CN domain indicated by the IE "CN domain identity". For FDD PBP=1.

The UE shall determine its idle mode paging occasions and PICH monitoring occasions for that CN domain, according to [4], based on the stored CN domain specific DRX cycle length, when using DRX in idle mode.

8.6.3.1b H-RNTI

If the IE “H-RNTI” is included, the UE shall:

- store the value in the variable H_RNTI;

8.6.4 Radio bearer information elements

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 or HS-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 "Explicit 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 "Explicit 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":
    - in FDD:
        - 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.

- in TDD:
  - use the first Transport Format of the PRACH of the IE "PRACH system information list" at the position equal to the value in the IE "RLC size index".
- 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 this CN domain 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 this 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 this 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 this 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 Transport channel information elements

8.6.5.1 Transport Format Set

8.6.5.5 Added or Reconfigured UL TrCH information

If the IE "Added or Reconfigured UL TrCH information" is included then the UE shall:

- for the transport channel identified by the IE "UL Transport Channel Identity" and IE "Uplink transport channel type":
  - perform the actions for the IE "Transport Format Set" as specified in subclause 8.6.5.1.

8.6.5.6 Added or Reconfigured DL TrCH information

If the IE "Added or Reconfigured DL TrCH information" is included then for the transport channel identified by the IE "DL Transport Channel Identity" the UE shall:

- if the choice "DL parameters" is set to 'independent':
  - perform the actions for the IE "Transport Format Set" as specified in subclause 8.6.5.1.
- if the choice "DL parameters" is set to 'same as uplink':
  - if the IE "UL Transport Channel Identity" indicates an existing or a new UL Transport Channel:
    - store as transport format for this transport channel the transport format associated with the transport channel identified by the IE "UL Transport Channel Identity".
  - else:
    - set the variable INVALID_CONFIGURATION to TRUE.
- if the choice "DL parameters" is set to 'HSDSCH'
  - if the IE "H-RNTI" is included,
    - perform the actions as specified in subclause 8.6.3.a;
  - if the IE "HSDSCH TFS" is included ,
    - perform the actions specificed in subclause 8.6.5.x;
  - if the IE "HARQ Info" is included,

- perform the actions specificed in subclause 8.6.5.y;

- if the IE "MAC-hs reset indicator" is present,

  - reset the MAC-hs entity[15];

- if the IE "DCH quality target" is included:

  - perform the actions specified in subclause 8.6.5.4.

- if the IE "Transparent mode signalling info" is included:

  - consider the messages received on this transport channel to have the message type according to the value of the IE "Type of message";

  - if the choice "Transparent signalling mode" is set to "Mode 1":

    - consider the messages received on this transport channel affect all established DCHs.

  - if the choice "Transparent signalling mode" is set to "Mode 2":

    - consider the messages received on this transport channel affect the DCHs identified with the IE "UL controlled transport channels" in the IE "Controlled transport channels list";

    - if any of the DCHs identified with the IE "UL controlled transport channels" in the IE "Controlled transport channels list" does not exist:

      - set the variable INVALID_CONFIGURATION to TRUE.

8.6.5.~~x~~6a HS-DSCH Transport Format Set

If the IE "HS-DSCH Transport Format Set" is included the UE shall:

- store the mapping of the TB size to the TBI (Transport Block Index);

- if the IE "MAC-d PDU size Info" is included,

  - store the mapping of the Size Index Identifier (SID) to the MAC-d PDU size included in the IE "MAC-d PDU size Info".

8.6.5.~~y~~6b HARQ Info

If the IE "HARQ Info" is included the UE shall:

- configure the MAC-hs entity with the number of HARQ processes indicated in IE "Number of Processes";

- if the IE "Memory Partitioning" is set to 'Implicit',

  - partition the sof t memory buffer in the MAC-hs entity equally among the processes configured above;

- if the IE "Memory Partitioning" is set to 'Explicit',

  - partition the soft memory buffer in the MAC-hs entity according to the IE"Process memory size";

- set the release timer for each of the priority queues in the MAC-hs entity to the value in the corresponding IE "T1".

8.6.5.7 Deleted UL TrCH information

If the IE "Deleted UL TrCH information" is included the UE shall:

- delete any information about the transport channel identified by the IE "UL TrCH identity" and IE "Uplink transport channel type".

8.6.5.8 Deleted DL TrCH information

If the IE "Deleted DL TrCH information" is included the UE shall:

- delete any information about the transport channel identified by the IE "DL TrCH identity" or IE "-MAC-d Flow Identity" as applicable.

8.6.6 Physical channel information elements

This section specifies the actions upon reception and/or non-reception of the physical channel information elements. The combination of the values of those information elements included in a given message shall follow the compatibility rules that are specified in the physical layer specifications. In case those rules are not followed, the UE shall set the variable INVALID_CONFIGURATION to TRUE.

8.6.6.4 Downlink information for each radio link

If the IE "Downlink information for each radio link" is included in a received message, the UE shall:

- if the UE would enter CELL_DCH state according to subclause 8.6.3.3 applied on the received message:
  - if the IE "SCCPCH Information for FACH" is included; and
  - if the UE is in FDD mode and is not capable of simultaneous reception of DPCH and Secondary CCPCH:
    - set the variable UNSUPPORTED_CONFIGURATION to TRUE;
    - if the UE is in FDD mode and is capable of simultaneous reception of DPCH and SCCPCH:
      - start to receive the indicated Secondary CCPCH.
    - if the UE is in TDD mode and shared transport channels are assigned to the UE:
      - start to receive the indicated Secondary CCPCH.
    - if the UE is in TDD mode and no shared transport channels are assigned to the UE:
      - set the variable UNSUPPORTED_CONFIGURATION to TRUE.
  - if the IE "Serving HS-DSCH radio link indicator " is set to 'TRUE':
    - consider this radio link as the serving HS-DSCH radio link;
    - if the serving HS-DSCH radio link was another radio link than this radio link prior to reception of the message and the IE “H-RNTI” is not included:
      - set the variable INVALID_CONFIGURATION to TRUE;
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link.
- if the UE would enter either the CELL_FACH, CELL_PCH or URA_PCH state according to subclause 8.6.3.3 applied on the received message:
  - if the received message is CELL UPDATE CONFIRM:
    - ignore the IE "Downlink information for each radio link".
  - if the received message is any other message than CELL UPDATE CONFIRM; and
  - if IEs other than the IE "Primary CPICH info" (for FDD) or the IE "Primary CCPCH info" (for TDD) are included in the IE "Downlink information for each radio link":
    - ignore these IEs.
  - act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link.

8.6.6.g Downlink HS-PDSCH Information

If the IE "Downlink HS-PDSCH Information" is included the UE shall:

- if the IE "H-RNTI" is included
  - perform the actions as specified in subclause 8.6.3.a;
- if the IE "HS-SCCH Info" is included
  - act as specified in subclause 8.6.6.h
- if the IE"Measurment Feedback Info" is included
  - act as specified in subclause 8.6.6.j

If the IE "Downlink HS-PDSCH Information" is not included, the UE shall:

- stop receiving any HS-SCCH(s);

8.6.6.h HS-SCCH Info

If the IE "HS-SCCH Info" is included the UE shall:

- in the case of FDD
  - receive the HS-SCCH(s) according to the IE "HS-SCCH channelisation code";
- in the case of TDD
  - receive the HS-SCCH(s) according to the IEs "Timeslot" and "Channelisation Code";
  - receive the HS-SICH according to the IEs "Timeslot" and "Channelisation Code";

8.6.6.j Measurement Feedback Info

If the IE "Measurement Feedback Info" is included the UE shall:

- store the received configuration.

8.6.6.5 Void

8.6.6.6 Uplink DPCH info

If the IE "Uplink DPCH info" is included, the UE shall:

- release any active uplink physical channels and activate the given physical channels;
- if the IE "Number of FBI bits" is not included:
  - use 0 FBI bits in the Uplink DPCH.

8.6.6.7 Void

8.6.6.11 Uplink DPCH power control info

The UE shall:

- in FDD:

- if the IE "Uplink DPCH power control info" is included:
    - if a synchronisation procedure is performed according to [29]:
        - calculate and set an initial uplink transmission power;
        - start inner loop power control as specified in subclause 8.5.3;
        - for the UL inner loop power control:
            - use the parameters specified in the IE.
    - else:
        - act on the IE "Power control algorithm" and the IE "TPC step size" if included and ignore any other IEs that are included.
- in 3.84 Mcps TDD:
    - if the IE "Uplink DPCH power control info" is included:
        - use the parameters specified in the IE for open loop power control as defined in subclause 8.5.7.
    - else:
        - use the current uplink transmission power.
- in 1.28 Mcps TDD:
    - if the IE "Uplink DPCH power control info" is included:
        - calculate and set an initial uplink transmission power;
        - start inner loop power control;
        - for the UL inner loop power control:
            - use the parameter specified in the IE.
    - else:
        - use the current uplink transmission power.
- both in FDD and TDD;
    - if the IE "Uplink DPCH power control info" is not included in a message used to enter CELL_DCH:
        - set the variable INVALID_CONFIGURATION to true.

8.6.6.12 Secondary CPICH info

If the IE Secondary CPICH info is included, the UE:

- may use the channelisation code according to IE "channelisation code", with scrambling code according to IE "DL scrambling code" in the IE "Secondary CPICH info", for channel estimation of that radio link;
- may use the pilot bits on DPCCH for channel estimation.

8.6.6.13 Primary CPICH usage for channel estimation

If the IE "Primary CPICH usage for channel estimation" is included and has the value "Primary CPICH may be used" the UE:

- may use the Primary CPICH for channel estimation;
- may use the pilot bits on DPCCH for channel estimation.

If the IE "Primary CPICH usage for channel estimation" is included and has the value "Primary CPICH shall not be used" the UE:

- shall not use the Primary CPICH for channel estimation;
- may use the Secondary CPICH for channel estimation;
- may use the pilot bits on DPCCH for channel estimation.

8.6.6.27 Downlink information common for all radio links

If the IE "Downlink information common for all radio links " is included the UE shall:

- if the IE "Downlink DPCH info common for all RL" is included:
  - perform actions as specified in subclause 8.6.6.28.
- if the IE choice "mode" is set to 'FDD':
  - perform actions for the IE "DPCH compressed mode info" as specified in subclause 8.6.6.15;
  - perform actions for the IE "Tx Diversity mode" as specified in subclause 8.6.6.24;
  - if the IE "SSDT information" is included:
    - perform actions as specified in subclause 8.6.6.25.
- if the IE "Default DPCH Offset value" is included:
  - perform actions as specified in the subclause 8.6.6.21.

8.6.6.28 Downlink DPCH info common for all radio links

If the IE "Downlink DPCH info common for all RL" is included the UE shall:

- perform actions for the IE "Timing indication" as specified in subclause 8.5.15.2;
- ignore the value received in IE "CFN-targetSFN frame offset";
- if the IE "Downlink DPCH power control information" is included:
  - perform actions for the IE "DPC Mode" according to [29].
- if the IE choice "mode" is set to 'FDD':
  - if the IE "Downlink rate matching restriction information" is included:
    - set the variable INVALID_CONFIGURATION to TRUE.
  - perform actions for the IE "spreading factor";
  - perform actions for the IE "Fixed or Flexible position";
  - perform actions for the IE "TFCI existence";
  - if the IE choice "SF" is set to 256:
    - store the value of the IE "Number of bits for pilot bits".
  - if the IE choice "SF" set to 128:
    - store the value of the IE "Number of bits for pilot bits".
- if the IE choice "mode" is set to 'TDD':

- perform actions for the IE "Common timeslot info".

If the IE "Downlink DPCH info common for all RL" is included in a message used to perform a Timing re-initialised hard handover, and ciphering is active for any radio bearer using RLC-TM, the UE shall, after having activated the dedicated physical channels indicated by that IE:

- increment HFN for RLC-TM by '1'.

10 Message and information element functional definition and content

10.1 General

The function of each Radio Resource Control message together with message contents in the form of a list of information elements is defined in subclause 10.2.

Functional definitions of the information elements are then described in subclause 10.3.

Information elements are marked as either MP - Mandatory present, MD - Mandatory with default value, OP - Optional, CV - Conditional on value or CH - Conditional on history (see Table 10.1 with information extracted from [14]).

Table 10.1: Meaning of abbreviations used in RRC messages and information elements

Abbreviation	Meaning
MP	Mandatory present A value for that information is always needed, and no information is provided about a particular default value. If ever the transfer syntax allows absence (e.g., due to extension), then absence leads to an error diagnosis.
MD	Mandatory with default value A value for that information is always needed, and a particular default value is mentioned (in the 'Semantical information' column). This opens the possibility for the transfer syntax to use absence or a special pattern to encode the default value.
CV	Conditional on value The need for a value for that information depends on the value of some other IE or IEs, and/or on the message flow (e.g., channel, SAP). The need is specified by means of a condition, the result of which may be that the information is mandatory present, mandatory with default value, not needed or optional. If one of the results of the condition is that the information is mandatory present, the transfer syntax must allow for the presence of the information. If in this case the information is absent an error is diagnosed. If one of the results of the condition is that the information is mandatory with default value, and a particular default value is mentioned (in the 'Semantical information' column), the transfer syntax may use absence or a special pattern to encode the default value. If one of the results of the condition is that the information is not needed, the transfer syntax must allow encoding the absence. If in this case the information is present, it will be ignored. In specific cases however, an error may be diagnosed instead. If one of the results of the condition is that the information is optional, the transfer syntax must allow for the presence of the information. In this case, neither absence nor presence of the information leads to an error diagnosis.
CH	Conditional on history The need for a value for that information depends on information obtained in the past (e.g., from messages

Abbreviation	Meaning
	received in the past from the peer). The need is specified by means of a condition, the result of which may be that the information is mandatory present, mandatory with default value, not needed or optional. The handling of the conditions is the same as described for CV.
OP	Optional The presence or absence is significant and modifies the behaviour of the receiver. However whether the information is present or not does not lead to an error diagnosis.

10.1.1 Protocol extensions

RRC messages may be extended in future versions of this protocol, either by adding values for choices, enumerated and size constrained types or by adding information elements. An important aspect concerns the behaviour of a UE, conforming to this revision of the standard, upon receiving a not comprehended future extension. The details of this error handling behaviour are provided in clause 9.

NOTE 1: By avoiding the need for partial decoding (skipping uncomprehended IEs to continue decoding the remainder of the message), the RRC protocol extension mechanism also avoids the overhead of length determinants for extensions.

Two kinds of protocol extensions are distinguished: non-critical and critical extensions. In general, a receiver shall process a message including not comprehended non-critical extensions as if the extensions were absent. However, a receiver shall entirely reject a message including not comprehended critical extensions (there is no partial rejection) and notify the sender, as specified in clause 9.

The general mechanism for adding critical extensions is by defining a new version of the message, which is indicated at the beginning of the message.

The UE shall always comprehend the complete transfer syntax specified for the protocol version it supports; if the UE comprehends the transfer syntax defined within protocol version A for message 1, it shall also comprehend the transfer syntax defined within protocol version A for message 2.

The following table shows for which messages only non-critical extensions may be added while for others both critical and non-critical extensions may be added.

NOTE 2: Critical extensions can only be added to certain downlink messages.

Extensions	Message
Critical and non-critical extensions	ACTIVE SET UPDATE 10.2.1 ASSISTANCE DATA DELIVERY 10.2.4 CELL CHANGE ORDER FROM UTRAN 10.2.5 CELL UPDATE CONFIRM 10.2.8 COUNTER CHECK 10.2.9 DOWNLINK DIRECT TRANSFER 10.2.11 HANDOVER TO UTRAN COMMAND 10.2.16a HANDOVER FROM UTRAN COMMAND 10.2.15 MEASUREMENT CONTROL 10.2.17 PHYSICAL CHANNEL RECONFIGURATION 10.2.22 PHYSICAL SHARED CHANNEL ALLOCATION 10.2.25 RADIO BEARER RECONFIGURATION 10.2.27 RADIO BEARER RELEASE 10.2.30 RADIO BEARER SETUP 10.2.33 RRC CONNECTION REJECT 10.2.36 RRC CONNECTION RELEASE 10.2.37 RRC CONNECTION SETUP 10.2.40 SECURITY MODE COMMAND 10.2.43 SIGNALLING CONNECTION RELEASE 10.2.46 TRANSPORT CHANNEL RECONFIGURATION 10.2.50 UE CAPABILITY ENQUIRY 10.2.55 UE CAPABILITY INFORMATION CONFIRM 10.2.57 UPLINK PHYSICAL CHANNEL CONTROL 10.2.59

Extensions	Message
	URA UPDATE CONFIRM 10.2.61 UTRAN MOBILITY INFORMATION 10.2.62
Non-critical extensions only	ACTIVE SET UPDATE COMPLETE 10.2.2 ACTIVE SET UPDATE FAILURE 10.2.3 CELL CHANGE ORDER FROM UTRAN FAILURE 10.2.6 CELL UPDATE 10.2.7 COUNTER CHECK RESPONSE 10.2.10 HANDOVER TO UTRAN COMPLETE 10.2.16b INITIAL DIRECT TRANSFER 10.2.16c HANDOVER FROM UTRAN FAILURE 10.2.16 MEASUREMENT CONTROL FAILURE 10.2.18 MEASUREMENT REPORT 10.2.19 PAGING TYPE 1 10.2.20 PAGING TYPE 2 10.2.21 PHYSICAL CHANNEL RECONFIGURATION COMPLETE 10.2.23 PHYSICAL CHANNEL RECONFIGURATION FAILURE 10.2.24 PUSCH CAPACITY REQUEST 10.2.26 RADIO BEARER RECONFIGURATION COMPLETE 10.2.28 RADIO BEARER RECONFIGURATION FAILURE 10.2.29 RADIO BEARER RELEASE COMPLETE 10.2.31 RADIO BEARER RELEASE FAILURE 10.2.32 RADIO BEARER SETUP COMPLETE 10.2.34 RADIO BEARER SETUP FAILURE 10.2.35 RRC CONNECTION RELEASE COMPLETE 10.2.38 RRC CONNECTION REQUEST 10.2.39 RRC CONNECTION SETUP COMPLETE 10.2.41 RRC STATUS 10.2.42 SECURITY MODE COMPLETE 10.2.44 SECURITY MODE FAILURE 10.2.45 SIGNALLING CONNECTION RELEASE INDICATION 10.2.47 Master Information Block 10.2.48.8.1 System Information Block type 1 to System Information Block type 17 10.2.48.8.2 to 10.2.48.8.19 SYSTEM INFORMATION CHANGE INDICATION 10.2.49 TRANSPORT CHANNEL RECONFIGURATION COMPLETE 10.2.51 TRANSPORT CHANNEL RECONFIGURATION FAILURE 10.2.52 TRANSPORT FORMAT COMBINATION CONTROL 10.2.53 TRANSPORT FORMAT COMBINATION CONTROL FAILURE 10.2.54 UE CAPABILITY INFORMATION 10.2.56 UPLINK DIRECT TRANSFER 10.2.58 URA UPDATE 10.2.60 UTRAN MOBILITY INFORMATION CONFIRM 10.2.63 UTRAN MOBILITY INFORMATION FAILURE 10.2.64
No extensions	SYSTEM INFORMATION 10.2.48 First Segment 10.2.48.1 Subsequent or last Segment 10.2.48.3 Complete SIB 10.2.48.5 SIB content 10.2.48.8.1

NOTE 3: For the SYSTEM INFORMATION message protocol extensions are only possible at the level of system information blocks.

10.1.1.1 Non-critical extensions

10.1.1.1.1 Extension of an information element with additional values or choices

In future versions of this protocol, non-critical values may be added to choices, enumerated and size constrained types.

For choices, enumerated and size constrained types it is possible to indicate how many non-critical spare values need to be reserved for future extension. In this case, the tabular format should indicate the number of spare values that are needed. Within the ASN.1 spare values should only be used to increase the encoded size of an IE. This means that the ASN.1 should only include spares if the number of spare values that is needed exceeds the number of undefined code points that exist after encoding of the information element.

For downlink messages, spare values may be defined for non-critical information elements for which the need is specified to be MD or OP (or CV case leading to MD or OP). In this case, a receiver not comprehending the received spare value shall consider the information element to have the default value or consider it to be absent respectively.

For uplink messages spare values may be defined for all information elements, including those for which the need is specified to be MP (or CV case leading to MP).

In all cases at most one spare should be defined for choices. In this case, information elements applicable to the spare choices shall be added to the end of the message.

10.1.1.1.2 Extension of a message with additional information elements

In future versions of this protocol, non-critical information elements may be added to RRC messages. These additional information elements shall be appended at the end of the message; the transfer syntax specified in this revision of the standard facilitates this. A receiver conformant to this revision of the standard shall accept such extension, and proceed as if it was not included.

10.1.1.2 Critical extensions

10.1.1.2.1 Extension of an information element with additional values or choices

In versions of this protocol, choices, enumerated and size constrained types may be extended with critical values. For extension with critical values the general critical extension mechanism is used, i.e. for this no spare values are reserved since backward compatibility is not required.

10.1.1.2.2 Extension of a message with additional information elements

In future versions of this protocol, RRC messages may be extended with new information elements. Since messages including critical extensions are rejected by receivers not comprehending them, these messages may be modified completely, e.g. IEs may be inserted at any place and IEs may be removed or redefined.

10.2 Radio Resource Control messages

10.2.1 ACTIVE SET UPDATE

NOTE: Only for FDD.

This message is used by UTRAN to add, replace or delete radio links in the active set of the UE.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now".
New U-RNTI	OP		U-RNTI 10.3.3.47	
CN information elements				
CN Information info	OP		CN Information info 10.3.1.3	
RB information elements				
Downlink 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	
Phy CH information elements				
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing "maximum UL TX power.
Downlink radio resources				
Radio link addition information	OP	1 to <maxRL-1>		Radio link addition information required for each RL to add
>Radio link addition information	MP		Radio link addition information 10.3.6.68	
Radio link removal information	OP	1 to <maxRL>		Radio link removal information required for each RL to remove
>Radio link removal information	MP		Radio link removal information 10.3.6.69	
TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing TX diversity mode.
SSDT information	OP		SSDT information 10.3.6.77	

10.2.8 CELL UPDATE CONFIRM

This message confirms the cell update procedure and can be used to reallocate new RNTI information for the UE valid in the new cell.

RLC-SAP: UM

Logical channel: CCCH or DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	MP		Message Type	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
UE Information Elements				
U-RNTI	CV-*CCCH*		U-RNTI 10.3.3.47	
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36	
Integrity check info	CH		Integrity check info 10.3.3.16	
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State Indicator 10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
RLC re-establish indicator (RB2, RB3 and RB4)	MP		RLC re-establish indicator 10.3.3.35	
RLC re-establish indicator (RB5 and upwards)	MP		RLC re-establish indicator 10.3.3.35	
CN Information Elements				
CN Information info	OP		CN Information info 10.3.1.3	
UTRAN Information Elements				
URA identity	OP		URA identity 10.3.2.6	
RB information elements				
RB information to release list	OP	1 to <maxRB>		
>RB information to release	MP		RB information to release 10.3.4.19	
RB information to reconfigure list	OP	1 to <maxRB>		
>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18	
RB information to be affected list	OP	1 to <maxRB>		
>RB information to be affected	MP		RB information	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			to be affected 10.3.4.17	
Downlink 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	
TrCH Information Elements				
Uplink transport channels				
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
CHOICE *mode*	MP			
>FDD				
>>CPCH set ID	OP		CPCH set ID 10.3.5.3	
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>		
>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>TDD				(no data)
Downlink transport channels				
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88.	
>CPCH SET Info			CPCH SET Info 10.3.6.13	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)
Downlink HS-PDSCH Information	OP		Downlink HS_PDSCH Information 10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link to be set-up
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

Condition	Explanation
CCCH	This IE is mandatory present when CCCH is used and ciphering is not required and not needed otherwise.

10.2.22 PHYSICAL CHANNEL RECONFIGURATION

This message is used by UTRAN to assign, replace or release a set of physical channels used by a UE.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State Indicator 10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
CN Information Elements				
CN Information info	OP		CN Information info 10.3.1.3	
UTRAN mobility information elements				
URA identity	OP		URA identity 10.3.2.6	
RB information elements				
Downlink 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	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing value of the maximum allowed UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88	
>CPCH SET Info			CPCH SET Info	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			10.3.6.13	
>CPCH set ID			CPCH set ID 10.3.5.3	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)
Downlink HS-PDSCH Information	OP		Downlink HS_PDSCH Information 10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

10.2.23 PHYSICAL CHANNEL RECONFIGURATION COMPLETE

This message is sent from the UE when a physical channel reconfiguration has been done.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
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*	MP				
>FDD				(no data)	
>TDD					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD	MP				REL-4
>>>>Uplink Timing Advance	OP		Uplink Timing Advance		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			10.3.6.95		
>>>1.28 Mcps TDD				(no data)	REL-4
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>			
>>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.	

10.2.24 PHYSICAL CHANNEL RECONFIGURATION FAILURE

This message is sent by UE if the configuration given by UTRAN is unacceptable or if the UE failed to assign, replace or release a set of physical channel(s).

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	
Failure cause	MP		Failure cause and error information 10.3.3.14	

10.2.27 RADIO BEARER RECONFIGURATION

This message is sent from UTRAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, reconfigure transport channels and physical channels.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State Indicator 10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
CN information elements				
CN Information info	OP		CN Information info 10.3.1.3	
UTRAN mobility information elements				
URA identity	OP		URA identity 10.3.2.6	
RB information elements				
RAB information to reconfigure list	OP	1 to < maxRABsetup >		
>RAB information to reconfigure	MP		RAB information to reconfigure 10.3.4.11	
RB information to reconfigure list	MP	1to <maxRB>		Although this IE is not always required, need is MP to align with ASN.1
>RB information to reconfigure	MP		RB information	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			to reconfigure 10.3.4.18	
RB information to be affected list	OP	1 to <maxRB>		
>RB information to be affected	MP		RB information to be affected 10.3.4.17	
TrCH Information Elements				
Uplink transport channels				
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
CHOICE *mode*	OP			
>FDD				
>>CPCH set ID	OP		CPCH set ID 10.3.5.3	
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>		
>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>TDD				(no data)
Downlink transport channels				
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigure	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			d DL TrCH information 10.3.5.1	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88	
>CPCH SET Info			CPCH SET Info 10.3.6.13	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	MP	1 to <maxRL>		Although this IE is not always required, need is MP to align with ASN.1
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

10.2.28 RADIO BEARER RECONFIGURATION COMPLETE

This message is sent from the UE when a RB and signalling link reconfiguration has been done.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
UE information elements					
RRC transaction identifier	MP		RRC transaction identifier		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			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*	MP				
>FDD				(no data)	
>TDD					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>Uplink Timing Advance	OP		Uplink Timing Advance 10.3.6.95		
>>>1.28 Mcps TDD				(no data)	REL-4
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>			
>>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.	

10.2.29 RADIO BEARER RECONFIGURATION FAILURE

This message is sent by UE if the configuration given by UTRAN is unacceptable or if the UE failed to establish the physical channel(s).

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	
RB information elements				
Radio bearers for which reconfiguration would have succeeded List	OP	1 to <maxRB>		
>Radio bearer for which reconfiguration would have succeeded	MP		RB identity, 10.3.4.16	

10.2.30 RADIO BEARER RELEASE

This message is used by UTRAN to release a radio bearer. It can also include modifications to the configurations of transport channels and/or physical channels. It can simultaneously indicate release of a signalling connection when UE is connected to more than one CN domain.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			Indicator 10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
CN Information Elements				
CN Information info	OP		CN Information info 10.3.1.3	
Signalling Connection release indication	OP		CN domain identity 10.3.1.1	
UTRAN mobility information elements				
URA identity	OP		URA identity 10.3.2.6	
RB Information Elements				
RAB information to reconfigure list	OP	1 to < maxRABsetup >		
>RAB information to reconfigure	MP		RAB information to reconfigure 10.3.4.11	
RB information to release list	MP	1 to <maxRB>		
>RB information to release	MP		RB information to release 10.3.4.19	
RB information to be affected list	OP	1 to <maxRB>		
>RB information to be affected	MP		RB information to be affected 10.3.4.17	
Downlink 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	
TrCH Information Elements				
Uplink transport channels				
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5	
Added or Reconfigured TrCH	OP	1 to		

Information Element/Group name	Need	Multi	Type and reference	Semantics description
information list		<maxTrCH >		
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
CHOICE *mode*	OP			
>FDD				
>>CPCH set ID	OP		CPCH set ID 10.3.5.3	
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >		
>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>TDD				(no data)
Downlink transport channels				
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6	
Deleted TrCH information list	OP	1 to <maxTrCH >		
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >		
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88	
>CPCH SET Info			CPCH SET Info 10.3.6.13	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link to be set-up
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

10.2.31 RADIO BEARER RELEASE COMPLETE

This message is sent from the UE when radio bearer release has been completed.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
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	
Uplink integrity protection activation info	OP		Integrity protection activation info 10.3.3.17		
CHOICE *mode*	MP				
>FDD				(no data)	
>TDD					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>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	
>>>1.28 Mcps TDD				(no data)	REL-4

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
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.	

10.2.32 RADIO BEARER RELEASE FAILURE

This message is sent by UE if the configuration given by UTRAN is unacceptable or if radio bearer cannot be released.

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	
RB information elements				
Radio bearers for which reconfiguration would have succeeded	OP	1 to <maxRB>		
>Radio bearer for which reconfiguration would have been succeeded	MP		RB identity, 10.3.4.16	

10.2.33 RADIO BEARER SETUP

This message is sent by UTRAN to the UE to establish new radio bearer(s). It can also include modifications to the configurations of transport channels and/or physical channels.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State Indicator	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
CN Information Elements				
CN Information info	OP		CN Information info 10.3.1.3	
UTRAN mobility information elements				
URA identity	OP		URA identity 10.3.2.6	
RB Information Elements				
Signalling RB information to setup list	OP	1 to <maxSRBsetup>		For each signalling radio bearer established
>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24	
RAB information to setup list	OP	1 to <maxRABsetup>		For each RAB established
>RAB information for setup	MP		RAB information for setup 10.3.4.10	
RB information to be affected list	OP	1 to <maxRB>		
>RB information to be affected	MP		RB information to be affected 10.3.4.17	
Downlink 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	
TrCH Information Elements				
Uplink transport channels				
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured UL	MP		Added or	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
TrCH information			Reconfigured UL TrCH information 10.3.5.2	
CHOICE *mode*	OP			
>FDD				
>>CPCH set ID	OP		CPCH set ID 10.3.5.3	
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>		
>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>TDD				(no data)
Downlink transport channels				
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels10.3.5.6	
Deleted TrCH information list	OP	1 to <maxTrCH>		
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88	
>CPCH SET Info			CPCH SET Info 10.3.6.13	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

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	Version
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					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>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	
>>>1.28 Mcps TDD				(No data)	REL-4
START	OP		START 10.3.3.38	This information element is not needed for transparent mode	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				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.	

10.2.35 RADIO BEARER SETUP FAILURE

This message is sent by UE, if it does not support the configuration given by 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	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	
RB information elements				
Radio bearers for which reconfiguration would have succeeded	OP	1 to <maxRB>		
>Radio bearer for which reconfiguration would have succeeded	MP		RB identity, 10.3.4.16	

10.2.50 TRANSPORT CHANNEL RECONFIGURATION

This message is used by UTRAN to configure the transport channel of a UE. This also includes a possible reconfiguration of physical channels. The message can also be used to assign a TFC subset and reconfigure physical channel.

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 protection mode info	OP		Integrity protection mode info 10.3.3.19	
Ciphering mode info	OP		Ciphering mode info	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			10.3.3.5	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"
New U-RNTI	OP		U-RNTI 10.3.3.47	
New C-RNTI	OP		C-RNTI 10.3.3.8	
H-RNTI	OP		H-RNTI 10.3.6.a	
RRC State Indicator	MP		RRC State Indicator 10.3.3.10	
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49	
CN Information Elements				
CN Information info	OP		CN Information info 10.3.1.3	
UTRAN mobility information elements				
URA identity	OP		URA identity 10.3.2.6	
RB information elements				
Downlink 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	
TrCH Information Elements				
Uplink transport channels				
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2	
CHOICE *mode*	OP			
>FDD				
>>CPCH set ID	OP		CPCH set ID 10.3.5.3	
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>		
>>>DRAC static information	MP		DRAC static information 10.3.5.7	
>TDD				(no data)
Downlink transport channels				
DL Transport channel information common for all	OP		DL Transport channel	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
transport channels			information common for all transport channels 10.3.5.6	
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>		
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1	
PhyCH information elements				
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
Uplink radio resources				
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power
CHOICE *channel requirement*	OP			
>Uplink DPCH info			Uplink DPCH info 10.3.6.88	
>CPCH SET Info			CPCH SET Info 10.3.6.13	
Downlink radio resources				
CHOICE *mode*	MP			
>FDD				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30	
>TDD				(no data)
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.a	
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24	
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27	

10.2.51 TRANSPORT CHANNEL RECONFIGURATION COMPLETE

This message is sent from the UE when a transport channel reconfiguration has been done.

RLC-SAP: AM

Logical channel: DCCH

Direction: UE → UTRAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
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					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>Uplink Timing Advance	OP		Uplink Timing Advance 10.3.6.95		
>>>1.28 Mcps TDD				(no data)	REL-4
RB Information elements					
COUNT-C activation time	OP		Activation time 10.3.3.1	Used for radio bearers mapped on RLC-TM. Only applicable if the UE is moving to CELL_DCH state due to this procedure	
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>			
>>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.	

10.2.52 TRANSPORT CHANNEL RECONFIGURATION FAILURE

This message is sent by UE if the configuration given by UTRAN is unacceptable or if the UE failed to establish the physical channel(s).

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	

10.2.55 UE CAPABILITY ENQUIRY

The UE CAPABILITY ENQUIRY is used by the UTRAN to enquire inter-RAT classmarks from the UE.

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
Capability update requirement	MP		Capability update requirement 10.3.3.2	

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 UE Information elements

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]

10.3.3.2 Capability Update Requirement

This IE indicates to the UE which specific capabilities to transfer to the network.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
UE radio access FDD capability update requirement	MP		Boolean	TRUE indicates update required	
UE radio access 3.84 Mcps TDD capability update requirement	MP		Boolean	TRUE indicates update required	Name changed in REL-4
UE radio access 1.28 Mcps TDD capability update requirement	MP		Boolean	TRUE indicates update required	REL-4
System specific capability update requirement list	OP	1 to <maxSystemCapability>		In this version, a maximum size of 4 of the list shall be applied and any items after the 4th item in the list shall be ignored.	
>System specific capability update requirement	MP		Enumerated (GSM)		

Default value is:

"UE radio capability FDD update requirement" = false

"UE radio capability 3.84 Mcps TDD update requirement" = false

"UE radio capability 1.28 Mcps TDD update requirement" = false

"System specific capability update requirement" not present.

10.3.3.d H-RNTI

The H-RNTI identifies an UE having a HS-PDSCH assignment within a cell.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
H-RNTI	MP		bit string(16)	

10.3.3.25 Physical channel capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
Downlink physical channel capability information elements					
FDD downlink physical channel capability	CH-*fdd_req_sup*				
>Max no DPCH/PDSCH codes	MP		Integer (1..8)	Maximum number of DPCH/PDSCH codes to be simultaneously received	
>Max no physical channel bits received	MP		Integer (600, 1200,	Maximum number of physical	

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
			2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800)	channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	
>Support for SF 512	MP		Boolean	TRUE means supported	
>Support of PDSCH	MP		Boolean	TRUE means supported	
> CHOICE *Support of HS-PDSCH*	MP				REL-5
>> Supported					REL-5
>>> HS-DSCH capability class	MP		Integer (0,…63)		REL-5
>> Unsupported				(no data)	REL-5
>Simultaneous reception of SCCPCH and DPCH	MP		Boolean	TRUE means supported	
>Simultaneous reception of SCCPCH, DPCH and PDSCH	CV-*if_sim_rec_pdsch_sup*		Boolean	TRUE means supported	
>Max no of S-CCPCH RL	CV-*if_sim_rec*		Integer(1)	Maximum number of simultaneous S-CCPCH radio links	
>Support of dedicated pilots for channel estimation	MD		Enumerated (true)	Presence of this element means supported and absence not supported. If the UE notifies support of this functionality, it should comply with the corresponding performance requirements. Note 1.	
3.84 Mcps TDD downlink physical channel capability	CH-*3.84_Mcps_tdd_req_sup*				Name changed in REL-4
>Maximum number of timeslots per frame	MP		Integer (1..14)		
>Maximum number of physical channels per frame	MP		Integer (1..224)		
>Minimum SF	MP		Integer (1, 16)		
>Support of PDSCH	MP		Boolean	TRUE means supported	
> CHOICE *Support of HS-PDSCH*	MP				REL-5
>> Supported					REL-5
>>> HS-DSCH capability class	MP		Integer (0,…63)		REL-5
>> Unsupported				(no data)	REL-5
>Maximum number of physical channels per timeslot	MP		Integer (1..16)		
1.28 Mcps TDD downlink	CH-				REL-4

Information Element/Group name	Need	Multi	Type and Reference	Semantics description	Version
physical channel capability	*1.28_Mcps_tdd_req_sup*				
>Maximum number of timeslots per subframe	MP		Integer (1..6)		REL-4
>Maximum number of physical channels per subframe	MP		Integer (1..96)		REL-4
>Minimum SF	MP		Integer (1, 16)		REL-4
>Support of PDSCH	MP		Boolean	TRUE means supported	REL-4
> CHOICE *Support of HS-PDSCH*	MP				REL-5
>> Supported					REL-5
>>> HS-DSCH capability class	MP		Integer (0….63)		REL-5
>> Unsupported				(no data)	REL-5
>Maximum number of physical channels per timeslot	MP		Integer (1..16)		REL-4
>Support of 8PSK	MP		Boolean	TRUE means supported	REL-4
Uplink physical channel capability information elements					
FDD uplink physical channel capability	CH-*fdd_req_sup*				
>Maximum number of DPDCH bits transmitted per 10 ms	MP		Integer (600, 1200, 2400, 4800. 9600, 19200. 28800, 38400, 48000, 57600)		
>Support of PCPCH	MP		Boolean	TRUE means supported	
3.84 Mcps TDD uplink physical channel capability	CH-*3.84_Mcps_tdd_req_sup*				Name changed in REL-4
>Maximum Number of timeslots per frame	MP		Integer (1..14)		
>Maximum number of physical channels per timeslot	MP		Integer (1, 2)		
>Minimum SF	MP		Integer (1, 2, 4, 8, 16)		
>Support of PUSCH	MP		Boolean	TRUE means supported	
1.28 Mcps TDD uplink physical channel capability	CH-*1.28_Mcps_tdd_req_sup*				REL-4
>Maximum Number of timeslots per subframe	MP		Integer (1..6)		REL-4
>Maximum number of physical channels per timeslot	MP		Integer (1, 2)		REL-4
>Minimum SF	MP		Integer (1, 2, 4, 8, 16)		REL-4
>Support of PUSCH	MP		Boolean	TRUE means supported	REL-4
>Support of 8PSK	MP		Boolean	TRUE means supported	REL-4

Condition	Explanation
if_sim_rec_pdsch_sup	The IE is mandatory present if the IE "Simultaneous reception of SCCPCH and DPCH" = True and IE Support of PDSCH = True. Otherwise this field is not needed in the message.
if_sim_rec	The IE is mandatory present if the IE "capability Simultaneous reception of SCCPCH and DPCH" = True. Otherwise this field is not needed in the message.
3.84_Mcps_tdd_req_sup	The IE is mandatory present if the IE "TDD RF capability" is present with the IE "Chip rate capability" set to "3.84 Mcps" and a 3.84 Mcps TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.
1.28_Mcps_tdd_req_sup	The IE is mandatory present if the IE "TDD RF capability" is present with the IE "Chip rate capability" set to "1.28 Mcps" and a 1.28 Mcps TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.
fdd_req_sup	The IE is mandatory present if the IE "Multi-mode capability" has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

NOTE 1: These performance requirements are defined in Release 5.

10.3.3.34 RLC capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Total RLC AM buffer size	MP		Integer (2,10,50,100,150,500,1000)	Total receiving and transmitting RLC AM buffer capability in kBytes
Maximum RLC AM Window Size	MP		Integer(2047,4095)	Maximum supported RLC TX and RX window in UE
Maximum number of AM entities	MP		Integer (3,4,5,6,8,16,30)	

10.3.3.40 Transport channel capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Downlink transport channel capability information elements				
Max no of bits received	MP		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all transport blocks received at an arbitrary time instant
Max convolutionally coded bits received	MP		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all convolutionally coded transport blocks received at an arbitrary time instant
Max turbo coded bits received	CV-*turbo_dec_sup*		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all turbo coded transport blocks received at an arbitrary time instant
Maximum number of simultaneous transport channels	MP		Integer(4, 8, 16, 32)	
Maximum number of simultaneous CCTrCH	MP		Integer (1..8)	
Max no of received transport blocks	MP		Integer(4, 8, 16, 32, 48, 64, 96, 128, 256, 512)	Maximum total number of transport blocks received within TTIs that end at within the same 10ms interval
Maximum number of TFC in the TFCS	MP		Integer(16, 32, 48, 64, 96, 128, 256, 512, 1024)	
Maximum number of TF	MP		Integer(32, 64, 128, 256, 512, 1024)	
Support for turbo decoding	MP		Boolean	TRUE means supported
Uplink transport channel capability information elements				
Max no of bits transmitted	MP		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all transport blocks transmitted at an arbitrary time instant

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Max convolutionally coded bits transmitted	MP		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all convolutionally coded transport blocks transmitted at an arbitrary time instant
Max turbo coded bits transmitted	CV-*turbo_enc_sup*		Integer(640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840)	Maximum sum of number of bits of all turbo coded transport blocks transmitted at an arbitrary time instant
Maximum number of simultaneous transport channels	MP		Integer(2, 4, 8, 16, 32)	
Maximum number of simultaneous CCTrCH of DCH type	CH-*tdd_req_sup*		Integer (1..8)	
Max no of transmitted transport blocks	MP		Integer(2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512)	Maximum total number of transport blocks transmitted within TTIs that start at the same time
Maximum number of TFC in the TFCS	MP		Integer(4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024)	
Maximum number of TF	MP		Integer(32, 64, 128, 256, 512, 1024)	
Support for turbo encoding	MP		Boolean	TRUE means supported

Condition	Explanation
turbo_dec_sup	The IE is mandatory present if the IE "Support of turbo decoding" = True. Otherwise this field is not needed in the message.
turbo_enc_sup	The IE is mandatory present if the IE "Support of turbo encoding" = True. Otherwise this field is not needed in the message.
tdd_req_sup	The IE is mandatory present if the IE "Multi-mode capability" has the value "TDD" or "FDD/TDD" and a TDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.3.41 UE multi-mode/multi-RAT capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Multi-RAT capability				
Support of GSM	MP		Boolean	
Support of multi-carrier	MP		Boolean	
Multi-mode capability	MP		Enumerated (TDD, FDD, FDD/TDD)	

10.3.3.42 UE radio access capability

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
ICS version	MP		Enumerated(R99	Indicates the release version of [42]-2 (Implementation Conformance Statement (ICS) proforma specification) that is applicable for the UE.	
			REL-4)		REL-4
PDCP capability	MP		PDCP capability 10.3.3.24		
RLC capability	MP		RLC capability 10.3.3.34		
MAC-hs capability	OP		MAC_hs capability 10.3.3.a		REL-5
Transport channel capability	MP		Transport channel capability 10.3.3.40		
RF capability FDD	OP		RF capability FDD 10.3.3.33		
RF capability TDD	OP		RF capability TDD 10.3.3.33b	One "TDD RF capability" entity shall be included for every Chip rate capability supported.	
		1 to 2			REL-4
Physical channel capability	MP		Physical channel capability 10.3.3.25		
UE multi-mode/multi-RAT capability	MP		UE multi-mode/multi-RAT capability 10.3.3.41		
Security capability	MP		Security capability 10.3.3.37		
UE positioning capability	MP		UE positioning capability 10.3.3.45		
Measurement capability	CH-*fdd_req_sup*		Measurement capability 10.3.3.21		

Condition	Explanation
fdd_req_sup	The IE is mandatory present if the IE "Multi-mode capability" has the value "FDD" or "FDD/TDD" and a FDD capability update has been requested in a previous message. Otherwise this field is not needed in the message.

10.3.3.a MAC-hs capability

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Total buffer size	MP		Integer ([50,100,150 ,200,300])	Total combined receiving buffer capability in RLC and MAC-hs in kBytes

10.3.4 Radio Bearer Information elements

10.3.4.21 RB mapping info

A multiplexing option for each possible transport channel this RB can be multiplexed on.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Information for each multiplexing option	MP	1 to <maxRBMuxOptions>			
>RLC logical channel mapping indicator	CV-*UL-RLCLogicalChannels*		Boolean	TRUE indicates that the first logical channel shall be used for data PDUs and the second logical channel shall be used for control PDUs. FALSE indicates that control and data PDUs can be sent on either of the two logical channels. This parameter is not used in this release and shall be set to TRUE.	
>Number of uplink RLC logical channels	CV-*UL-RLC info*	1 to MaxLoCHperRLC		1 or 2 logical channels per RLC entity or radio bearer RLC [16]	
>>Uplink transport channel type	MP		Enumerated(DCH,RACH, CPCH,USCH)	CPCH is FDD only USCH is TDD only	
>>ULTransport channel identity	CV-*UL-DCH/USCH*		Transport channel identity 10.3.5.18	This is the ID of a DCH or USCH (TDD only) that this RB could be mapped onto.	
>>Logical channel identity	OP		Integer(1..15)	This parameter is used to distinguish logical channels multiplexed by MAC on a transport channel.	
>>CHOICE *RLC size list*	MP			The RLC sizes that are allowed for this logical channel For radio bearers	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				mapped to RACH, "Explicit list" is the only valid choice. The UE shall regard all other choices as undefined IE values and handle these as specified in clause 9.	
>>>All			Null	All RLC sizes listed in the *Transport Format Set*. 10.3.5.23	
>>>Configured			Null	The RLC sizes configured for this logical channel in the *Transport Format Set*. 10.3.5.23 if present in this message or in the previously stored configuration otherwise	
>>>Explicit List		1 to <maxTF>		Lists the RLC sizes that are valid for the logical channel.	
>>>>RLC size index	MP		Integer(1..maxTF)	The integer number is a reference to the *RLC size* which arrived at that position in the *Transport Format Set* 10.3.5.23	
>>MAC logical channel priority	MP		Integer(1..8)	This is priority between a user's different RBs (or logical channels). [15]	
>Downlink RLC logical channel info	CV-*DL-RLC info*				
>>Number of downlink RLC logical channels	*MD*	1 to MaxLoCHperRLC		1 or 2 logical channels per RLC entity or radio bearer RLC [16] Default value is that parameter values for DL are exactly the same as for corresponding UL logical channel. In case two multiplexing options are specified for the UL, the first options shall be used as default for the DL. As regards to the IE "Channel type",	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				rule is specified in 8.6.4.8.	
>>>Downlink transport channel type	MP		Enumerated(DCH,FACH, DSCH,DCH+ DSCH		
			, HS-DSCH, DCH + HS-DSCH)		REL-5
>>>DL DCH Transport channel identity	CV-*DL-DCH*		Transport channel identity 10.3.5.18		
>>>DL DSCH Transport channel identity	CV-*DL-DSCH*		Transport channel identity 10.3.5.18		
>>>DL HS-DSCH MAC-d flow identity	*C-DL-HS-DSCH*		MAC-d flow identity 10.3.5.a		REL-5
>>>Logical channel identity	OP		Integer(1..15)	16 is reserved	

Condition	Explanation
UL-RLC info	If "CHOICE *Uplink RLC mode*" in the IE "RLC info" that applies for that RB (i.e. either the one stored or received in the same message for the RB for which the "RB mapping info" was received, or the one stored or received in the same message for the RB pointed at in the IE "Same as RB" in the IE "RB information to setup" stored or received in the same message) is present this IE is mandatory present. Otherwise the IE is not needed.
DL-RLC info	If "CHOICE *Downlink RLC mode*" in the IE "RLC info" that applies for that RB (i.e. either the one stored or received in the same message for the RB for which the "RB mapping info" was received, or the one stored or received in the same message for the RB pointed at in the IE "Same as RB" in the IE "RB information to setup" stored or received in the same message) is present this IE is mandatory present. Otherwise the IE is not needed.
UL-RLCLogicalChannels	If "Number of uplink RLC logical channels" in IE "RB mapping info" is 2, then this IE is mandatory present. Otherwise this IE is not needed.
UL-DCH/USCH	If IE "Uplink transport channel type" is equal to "DCH" or "USCH" (TDD only) this IE is mandatory present. Otherwise the IE is not needed.
DL-DCH	If IE "Downlink transport channel type" is equal to "DCH" or "DCH+DSCH" this IE is mandatory present. Otherwise the IE is not needed.
DL-DSCH	If IE "Downlink transport channel type" is equal to "DSCH" or "DCH+DSCH" this IE is mandatory present. Otherwise the IE is not needed.
DL-HSDSCH	If IE "Downlink transport channel type" is equal to "HSDSCH" this IE is mandatory present. Otherwise the IE is not needed.

10.3.5 Transport CH Information elements

10.3.5.1 Added or Reconfigured DL TrCH information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Downlink transport channel type	MP		Enumerated(DCH,DSCH, HSDSCH)	
DL Transport channel identity	~~MP~~CV-not HS-DSCH		Transport channel identity 10.3.5.18	
DL HS-DSCH MAC-d flow identity	C-HS-DSCH		MAC-d flow identity 10.3.5.a	
CHOICE *DL parameters*				
>Explicit				
>>TFS	MP		Transport Format Set 10.3.5.23	
>SameAsUL				
>>Uplink transport channel type	MP		Enumerated(DCH,USCH)	USCH is TDD only
>>UL TrCH identity	MP		Transport channel identity 10.3.5.18	Same TFS applies as specified for indicated UL TrCH
>HS-DSCH				
>>HS-DSCH TFS	OP		HS-DSCH Transport Format Set 10.3.5.b	Provides the mapping of the transport format resource indicator to the transport block size
>>HARQ Info	OP		10.3.5.c	
>>MAC-hs reset indicator	MP		Boolean	TRUE Indicates the MAC-hs entity needs to be reset.
DCH quality target	OP		Quality target 10.3.5.10	
Transparent mode signalling info	CV-*MessageType*		Transparent mode signalling info 10.3.5.17	This IE is not used in RB RELEASE message nor RB RECONFIGURATION message

Condition	Explanation
MessageType	This IE is not needed in Radio Bearer Release message and Radio Bearer Reconfiguration message. Otherwise it is optional.
NotHS-DSCH	If the downlink transport channel type is DCH or DSCH then this IE is mandatory otherwise it is not needed.
HS-DSCH	If the downlink transport channel type is HSDSCH then this IE is mandatory otherwise it is not needed.

10.3.5.a MAC-d Flow Identity

Information Element/Group name	Need	Multi	Type and reference	Semantics description
MAC-d flow identity	MP		Integer(1..8)	

10.3.5.b HS-DSCH Transport Format Set

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Dynamic Transport Format Information	MP	1 to <maxHSDSCH_TBindex>		
>Transport Block Size	MP		Integer ([FFS])	Provides mapping of the Transport Block Index sent on the HS-SCCH to the dynamic Transport Block size
MAC-d PDU size Info	OP	<1 to max MACdPDU sizes>		
>MAC-d PDU size	MP		Integer () FFS	Mapping of the dfferent MAC-d PDU sizes configured for the HS-DSCH to the SID in the MAC-hs header.

10.3.5.c HARQ Info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Number of Processes	MP		Integer (1..6)	
CHOICE *Memory Partitioning*	MP			
>Implicit				UE shall apply memory partitioning of equal size across all HARQ processes
>Explicit				
>> Memory size	MP	<1 to maxHProcess>		
>>> Process Memory size	MP		FFS	Memory size in kbytes
Re-ordering Release Timer	MP	<1 to maxQueueID>		
> T1	MP			Timer when PDUs are released to the upper layers even though there are outstanding PDUs with lower TSN values.

10.3.5.2 Added or Reconfigured UL TrCH information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink transport channel type	MP		Enumerated(DCH,USCH)	USCH is TDD only
UL Transport channel identity	MP		Transport channel identity 10.3.5.18	
TFS	MP		Transport Format Set 10.3.5.23	

NOTE This information element is included within IE "Predefined RB configuration""

10.3.5.3 CPCH set ID

NOTE: Only for FDD.

This information element indicates that this transport channel may use any of the Physical CPCH channels defined in the CPCH set info, which contains the same CPCH set ID. The CPCH set ID associates the transport channel with a set of PCPCH channels defined in a CPCH set info IE and a set of CPCH persistency values. The CPCH set info IE(s) and the CPCH persistency values IE(s) each include the CPCH set ID and are part of the SYSTEM INFORMATION message

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CPCH set ID	MP		Integer(1...maxCPCHsets)	Identifier for CPCH set info and CPCH persistency value messages

10.3.5.4 Deleted DL TrCH information

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Downlink transport channel type	MP		Enumerated(DCH,DSCH,		
			HS-DSCH)		REL-5
DL Transport channel identity	MP	Transport channel identity 10.3.5.18			
	C-notHS-DSCH				REL-5
DL HS-DSCH MAC-d flow identity	C-HS-DSCH		MAC-d flow identity 10.3.5.a		REL-5

Condition	Explanation
NotHS-DSCH	If the downlink transport channel type is DCH or DSCH then this IE is mandatory otherwise it is not needed.
HS-DSCH	If the downlink transport channel type is HSDSCH then this IE is mandatory otherwise it is not needed.

10.3.5.5 Deleted UL TrCH information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Uplink transport channel type	MP		Enumerated(DCH,USCH)	USCH is TDD only
UL Transport channel identity	MP		Transport channel identity 10.3.5.18	

10.3.6 Physical CH Information elements

10.3.6.20 Downlink DPCH info common for all RL Pre

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256, 512)	Defined in CHOICE SF512-Andpilot with "number of its for pilot bits" in ASN.1
>>Fixed or Flexible Position	MP		Enumerated (Fixed, Flexible)	
>>TFCI existence	MP		Boolean	TRUE indicates that TFCI exists
>>CHOICE *SF*	MP			
>>>SF = 256				
>>>>Number of bits for Pilot bits	MP		Integer (2,4,8)	In bits
>>>SF = 128				
>>>>Number of bits for Pilot bits	MP		Integer(4,8)	In bits
>>>Otherwise				(no data)
>TDD				
>>Common timeslot info	MP		Common Timeslot Info 10.3.6.10	

CHOICE *SF*	Condition under which the given *SF* is chosen
SF=128	"Spreading factor" is set to 128
SF=256	"Spreading factor" is set to 256
Otherwise	"Spreading factor" is set to a value distinct from 128 and 256

10.3.6.21 Downlink DPCH info for each RL

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>Primary CPICH usage for channel estimation	MP		Primary CPICH usage for channel estimation 10.3.6.62		
>>DPCH frame offset	MP		Integer(0..381	Offset (in number of chips)	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			44 by step of 256)	between the beginning of the P-CCPCH frame and the beginning of the DPCH frame This is called $\tau_{DPCH,n}$ in [26]	
>>Secondary CPICH info	OP		Secondary CPICH info 10.3.6.73		
>>DL channelisation code	MP	1 to <maxDPCH-DLchan>		For the purpose of physical channel mapping [27] the DPCHs are numbered, starting from DPCH number 1, according to the order that they are contained in this IE.	
>>>Secondary scrambling code	MD		Secondary scrambling code 10.3.6.74	Default is the same scrambling code as for the Primary CPICH	
>>>Spreading factor	MP		Integer(4, 8, 16, 32, 64, 128, 256, 512)	Defined in CHOICE SF512-AndCodenumber with "code number" in ASN.1	
>>>Code number	MP		Integer(0..Spreading factor - 1)		
>>>Scrambling code change	CH-*SF/2*		Enumerated (code change, no code change)	Indicates whether the alternative scrambling code is used for compressed mode method 'SF/2'.	
>>TPC combination index	MP		TPC combination index 10.3.6.85		
>>SSDT Cell Identity	OP		SSDT Cell Identity 10.3.6.76		
>>Closed loop timing adjustment mode	CH-*TxDiversity Mode*		Integer(1, 2)	It is present if current TX Diversity Mode in UE is "closed loop mode 1" or "closed loop mode 2". Value in slots	
>TDD					
>>DL CCTrCh List	MP	1..<maxCCTrCH>			
>>>TFCS ID	MD		Integer(1..8)	Identity of this CCTrCh. Default value is 1	
>>>Time info	MP		Time Info 10.3.6.83		
>>>Common timeslot info	MD		Common Timeslot Info 10.3.6.10	Default is the current Common timeslot info	
>>>Downlink DPCH timeslots and codes	MD		Downlink Timeslots and Codes 10.3.6.32	Default is to use the old timeslots and codes.	
>>>UL CCTrCH TPC List	MD	0..<maxCCTrCH>		UL CCTrCH identities for TPC commands associated with this DL CCTrCH. Default is previous list or all defined UL CCTrCHs	
>>>>UL TPC TFCS Identity	MP		Transport Format Combination Set Identity 10.3.5.21		

Condition	Explanation
SF/2	The information element is mandatory present if the UE has an active compressed mode pattern sequence, which is using compressed mode method "SF/2". Otherwise the IE is not needed.
TxDiversity Mode	This IE is mandatory present if current TX Diversity Mode in UE is "closed loop mode 1" or "closed loop mode 2". Otherwise the IE is not needed.

10.3.6.22 Downlink DPCH info for each RL Post

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>Primary CPICH usage for channel estimation	MP		Primary CPICH usage for channel estimation 10.3.6.62	
>>Secondary scrambling code	MD		Secondary scrambling code 10.3.6.74	Default is the same scrambling code as for the Primary CPICH
>>CHOICE *Spreading factor*	MP		Integer(4, 8, 16, 32, 64, 128, 256, 512)	Defined in CHOICE SF512-AndCodenumber with "code number" in ASN.1
>>Code number	MP		Integer(0.. Spreading factor - 1)	
>>Scrambling code change	CH-*SF/2*		Enumerated (code change, no code change)	Indicates whether the alternative scrambling code is used for compressed mode method 'SF/2'.
>>>TPC combination index	MP		TPC combination index 10.3.6.85	
>TDD				
>>Downlink DPCH timeslots and codes	MP		Downlink Timeslots and Codes 10.3.6.32	

10.3.6.23 Downlink DPCH power control information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>DPC Mode	MP		Enumerated (Single TPC, TPC triplet in soft)	"Single TPC" is DPC_Mode=0 and "TPC triplet in soft" is DPC_mode=1 in [29].
>TDD				
>>TPC Step Size	OP		Integer (1, 2, 3)	In dB

10.3.6.24 Downlink information common for all radio links

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Downlink DPCH info common for all RL	OP		Downlink DPCH info common for all RL 10.3.6.18		
CHOICE *mode*	MP				
>FDD					
>>DPCH compressed mode info	MD		DPCH compressed mode info 10.3.6.33	Default value is the existing value of DPCH compressed mode information	
>>TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing value of TX Diversity mode	
>>SSDT information	OP		SSDT information 10.3.6.77		
>TDD				(no data)	
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD				(no data)	REL-4
>>>1.28 Mcps TDD					REL-4
>>>>TSTD indicator	MP		TSTD indicator 10.3.6.85a		REL-4
Default DPCH Offset Value	OP		Default DPCH Offset Value, 10.3.6.16		

10.3.6.25 Downlink information common for all radio links Post

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Downlink DPCH info common for all RL	MP		Downlink DPCH info common for all RL Post 10.3.6.19	

10.3.6.26 Downlink information common for all radio links Pre

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Downlink DPCH info common for all RL	MP		Downlink DPCH info common for all RL Pre 10.3.6.20	

10.3.6.a1 Downlink HS-PDSCH Information

Information Element/Group name	**Need**	**Multi**	**Type and reference**	**Semantics description**
HS-SCCH Info	OP		HS-SCCH Info 10.3.6.a	
CHOICE *mode*	MP			
>FDD				
>>Measurement Feedback Info	OP		Measurement Feedback Info 10.3.6.b	
>TDD				(no data)

10.3.6.a2 HS-SCCH Info

Information Element/Group name	**Need**	**Multi**	Type and reference	**Semantics description**
CHOICE mode	MP			
>FDD				
>>HS-SCCH Channelisation Code Information	MP	<1 to maxHSSCCHcodes>		
>>>HS-SCCH Channelisation Code	MP		Integer(0..127)	
>TDD				
>>CHOICE *TDD option*	MP			
>>>3.84 Mcps				
>>>>HS-SCCH Set Configuration	MP	1 to <maxHS-SCCHs>		
>>>>>Timeslot number	MP		Integer(0..14)	
>>>>>Channelisation code	MP		Enumerated((16/1)..(16/16))	
>>>>>Midamble Allocation mode	MP		Enumerated (Default midamble, Common midamble)	HS-SCCH always uses burst type 1.
>>>>>Midamble configuration	MP		Integer(4, 8, 16)	
>>>>>BLER target	MP		Real(-3.15..0 by step of 0.05)	Signalled value is Log10(HS-SCCH BLER quality target)
>>>>>HS-SICH configuration				
>>>>>>Timeslot number	MP		Integer(0..14)	
>>>>>>Channelisation code	MP		Enumerated((16/1)..(16/16))	
>>>>>>Midamble Allocation mode	MP		Enumerated (Default midamble, UE specific midamble)	
>>>>>>Midamble configuration	MP		Integer(4, 8, 16)	
>>>>>>Midamble Shift	CV-*UE*		Integer(0..15)	
>>>>>>NAck-Ack Power Offset	MP		Integer(0..7 by step of 1)	dB
>>>>>>UL target SIR	MP		Real(-11..20 by step of	dB

			0.5)	
>>>1.28 Mcps				
>>>>HS-SCCH Set Configuration	MP	1 to <maxHS-SCCHs>		
>>>>>Timeslot number	MP		Integer(0..6)	
>>>>>First Channelisation code	MP		Enumerated((16/1) ..(16/16))	
>>>>>Second Channelisation code	MP		Enumerated((16/1) ..(16/16))	
>>>>>Midamble Allocation mode	MP		Enumerated (Default midamble, Common midamble)	
>>>>>Midamble configuration	MP		Integer(2, 4, 6, 8, 10, 12, 14, 16)	
>>>>>BLER target	MP		Real(-3.15..0 by step of 0.05)	Signalled value is Log10(HS-SCCH BLER quality target)
>>>>>HS-SICH configuration				
>>>>>>Timeslot number	MP		Integer(0..6)	
>>>>>>Channelisation code	MP		Enumerated((16/1) ..(16/16))	
>>>>>>Midamble Allocation mode	MP		Enumerated (Default midamble, UE specific midamble)	
>>>>>>Midamble configuration	MP		Integer(2, 4, 6, 8, 10, 12, 14, 16)	
>>>>>>Midamble Shift	CV-*UE*		Integer(0..15)	
>>>>>>NAck-Ack Power Offset	MP		Integer(0..7 by step of 1)	dB.
>>>>>>PRX$_{HS-SICH}$	MP		Integer(-120..-58 by step of 1)	dBm. Desired power level for HS-SICH.
>>>>>>TPC step size	MP		Integer(1,2,3)	dB.

Condition	Explanation
UE	This IE is mandatory present when the value of the IE “Midamble Allocation Mode” is “UE specific midamble” and not needed otherwise.

10.3.6.b Measurement Feedback Info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
BLERthreshold	MP		FFS		REL-5
CHOICE *mode*	MP				REL-5
>FDD					REL-5
>>POhsdsch	MP		Integer (-x to 0)	Default Power offset between HS-PDSCH and P-CPICH/S-CPICH. In dB.	REL-5
>>Feedback cycle k	MP		Integer ([0,1,5,10, 20,40,80])	Multiples of 2 ms intervals. Value 10 corresponds to 20 ms.	REL-5
>>Feedback offset, off	MP		Integer(1, 2,…5)	Exact definition is FFS	REL-5
>TDD				(no data)	REL-5

10.3.6.27 Downlink information for each radio link

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	
>>PDSCH with SHO DCH Info	OP		PDSCH with SHO DCH Info 10.3.6.47	
>>PDSCH code mapping	OP		PDSCH code mapping 10.3.6.43	
>>Serving HS-DSCH radio link indicator	MP		Boolean	The value “TRUE” indicates that this radio link is the serving HS-DSCH radio link
>TDD				
>>Primary CCPCH info	MP		Primary CCPCH info 10.3.6.57	
Downlink DPCH info for each RL	OP		Downlink DPCH info for each RL 10.3.6.21	
SCCPCH Information for FACH	OP		SCCPCH Information for FACH 10.3.6.70	

10.3.6.28 Downlink information for each radio link Post

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				
>>Primary CCPCH info	MP		Primary CCPCH info post	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			10.3.6.58	
Downlink DPCH info for each RL	MP		Downlink DPCH info for each RL Post 10.3.6.22	

10.3.6.29 Void

10.3.6.91 Uplink DPCH power control info

Parameters used by UE to set DPCH initial output power and to use for closed-loop power control in FDD and 1.28 Mcps TDD and parameters for uplink open loop power control in 3.84 Mcps TDD.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>DPCCH Power offset	MP		Integer(-164,..-6 by step of 2)	In dB	
>>PC Preamble	MP		Integer (0..7)	In number of frames	
>>SRB delay	MP		Integer(0..7)	In number of frames	
>>Power Control Algorithm	MP		Enumerated (algorithm 1, algorithm 2)	Specifies algorithm to be used by UE to interpret TPC commands	
>>TPC step size	CV-*algo*		Integer (1, 2)	In dB	
>>DPCCH-2 Power offset	OP		Integer ([-164….-6])	In dB.	REL-5
>TDD					
>>CHOICE *TDD option*					REL-4
>>>3.84 Mcps TDD					REL-4
>>>>UL target SIR	OP		Real (-11 .. 20 by step of 0.5dB)	In dB	
>>>1.28 Mcps TDD					REL-4
>>>> $PRX_{PDPCHdes}$	OP		Integer(-120…-58 by step of 1)	in dBm	REL-4
>>CHOICE *UL OL PC info*	MP				
>>>Broadcast UL OL PC info			Null	No data	
>>>Individually Signalled	OP				
>>>>CHOICE *TDD option*	MP				REL-4
>>>>>3.84 Mcps TDD					REL-4
>>>>>>Individual timeslot interference info	MP	1 to <maxTS>			
>>>>>>>Individual timeslot interference	MP		Individual timeslot interference 10.3.6.38		
>>>>>>DPCH Constant Value	OP		Constant Value 10.3.6.11	Quality Margin	
>>>>>1.28 Mcps TDD					REL-4

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>>>>>>TPC step size	MP		Integer(1,2,3)		REL-4
>>>>Primary CCPCH Tx Power	OP		Primary CCPCH Tx Power 10.3.6.59	For Pathloss Calculation	

Condition	Explanation
algo	The IE is mandatory present if the IE "Power Control Algorithm" is set to "algorithm 1", otherwise the IE is not needed

10.3.6.92 Uplink DPCH power control info Post

Parameters used by UE to set DPCH initial output power and to use for closed-loop power control.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>DPCCH Power offset	MP		Integer(-110..-50 by step of 4)	In dB	
>>PC Preamble	MP		Integer (0..7)	in number of frames	
>>SRB delay	MP		Integer (0..7)	In number of frames	
>TDD					
>>UL target SIR	MP		Real (-11 .. 20 by step of 0.5dB)	In dB	
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>UL Timeslot Interference	MP		UL Interference 10.3.6.87		
>>>1.28 Mcps TDD				(no data)	REL-4

Condition	Explanation
algo	The IE is mandatory present if the IE "Power Control Algorithm" is set to "algorithm 1", otherwise the IE is not needed

10.3.6.93 Uplink DPCH power control info Pre

Parameters used by UE to set DPCH initial output power and to use for closed-loop power control in FDD and parameters for uplink open loop power control in 3.84 Mcps TDD.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>Power Control Algorithm	MP		Enumerated (algorithm 1, algorithm 2)	Specifies algorithm to be used by UE to interpret TPC commands	
>>TPC step size	CV-*algo*		Integer (1, 2)	In dB	
>>TPC step size	CV-*algo*		Integer (1, 2)	In dB	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>TDD				(No data)	
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>DPCH Constant Value	MP		Constant Value 10.3.6.11	Quality Margin	
>>>1.28 Mcps TDD				(no data)	REL-4

Condition	Explanation
Algo	The IE is mandatory present if the IE "Power Control Algorithm" is set to "algorithm 1", otherwise the IE is not needed

10.3.10 Multiplicity values and type constraint values

The following table includes constants that are either used as multi bounds (name starting with "max") or as high or low value in a type specification (name starting with "lo" or "hi"). Constants are specified only for values appearing more than once in the RRC specification. In case a constant is related to one or more other constants, an expression is included in the "value" column instead of the actual value.

Constant	Explanation	Value	Version
CN information			
maxCNdomains	Maximum number of CN domains	4	
UTRAN mobility information			
maxRAT	Maximum number or Radio Access Technologies	maxOtherRAT + 1	
maxOtherRAT	Maximum number or other Radio Access Technologies	15	
maxURA	Maximum number of URAs in a cell	8	
maxInterSysMessages	Maximum number of Inter System Messages	4	
maxRABsetup	Maximum number of RABs to be established	16	
UE information			
maxtransactions	Maximum number of parallel RRC transactions in downlink	25	
maxPDCPalgoType	Maximum number of PDCP algorithm types	8	
maxDRACclasses	Maximum number of UE classes which would require different DRAC parameters	8	
maxFreqBandsFDD	Maximum number of frequency bands supported by the UE as defined in [21]	8	
maxFreqBandsTDD	Maximum number of frequency bands supported by the UE as defined in [22]	4	
maxFreqBandsGSM	Maximum number of frequency bands supported by the UE as defined in [45]	16	
maxPage1	Number of UEs paged in the Paging Type 1 message	8	
maxSystemCapability	Maximum number of system specific capabilities that can be requested in one message.	16	
RB information			
maxPredefConfig	Maximum number of predefined configurations	16	
maxRB	Maximum number of RBs	32	
maxSRBsetup	Maximum number of signalling RBs to be established	8	
maxRBperRAB	Maximum number of RBs per RAB	8	
maxRBallRABs	Maximum number of non signalling RBs	27	
maxRBMuxOptions	Maximum number of RB multiplexing options	8	
maxLoCHperRLC	Maximum number of logical channels per RLC entity	2	
MaxROHC-PacketSizes	Maximum number of packet sizes that are allowed to be produced by ROHC.	16	
MaxROHC-Profiles	Maximum number of profiles supported by ROHC on a given RB.	8	

Constant	Explanation	Value	Version
TrCH information			
MaxHProcesses	Maximum number of H-ARQ processes	[6]	REL-5
MaxHSDSCH_TB_index	Maximum number of TB set size configurations for the HS-DSCH.	64 (FDD and 1.28 MCPS TDD); 512 (3.84 Mcps TDD)	REL-5
maxMACdPDUSizes	Maximum number of MAC-d PDU sizes per Size index identifier (SID) permitted for MAC-hs	[16]	REL-5
maxQueueID	Maximum number of HS-DSCH re-ordering queues	8	REL-5
maxTrCH	Maximum number of transport channels used in one direction (UL or DL)	32	
maxTrCHpreconf	Maximum number of preconfigured Transport channels, per direction	16	
maxCCTrCH	Maximum number of CCTrCHs	8	
maxTF	Maximum number of different transport formats that can be included in the Transport format set for one transport channel	32	
maxTF-CPCH	Maximum number of TFs in a CPCH set	16	
maxTFC	Maximum number of Transport Format Combinations	1024	
maxTFCI-1-Combs	Maximum number of TFCI (field 1) combinations	512	
maxTFCI-2-Combs	Maximum number of TFCI (field 2) combinations	512	
maxCPCHsets	Maximum number of CPCH sets per cell	16	
maxSIBperMsg	Maximum number of complete system information blocks per SYSTEM INFORMATION message	16	
maxSIB	Maximum number of references to other system information blocks.	32	
maxSIB-FACH	Maximum number of references to system information blocks on the FACH	8	
PhyCH information			
maxHSSCCHcodes	Maximum number of HSSCCH codes that can be assigned to a UE	[4]	REL-5
maxPCPCH-APsubCH	Maximum number of available sub-channels for AP signature on PCPCH	12	
maxPCPCH-CDsubCH	Maximum number of available sub-channels for CD signature on PCPCH	12	
maxPCPCH-APsig	Maximum number of available signatures for AP on PCPCH	16	
maxPCPCH-CDsig	Maximum number of available signatures for CD on PCPCH	16	
maxAC	Maximum number of access classes	16	
maxASC	Maximum number of access service classes	8	
maxASCmap	Maximum number of access class to access service classes mappings	7	
maxASCpersist	Maximum number of access service classes for which persistence scaling factors are specified	6	
maxPRACH	Maximum number of PRACHs in a cell	16	
MaxPRACH_FPACH	Maximum number of PRACH / FPACH pairs in a cell (1.28 Mcps TDD)	8	REL-4
maxFACHPCH	Maximum number of FACHs and PCHs mapped onto one secondary CCPCHs	8	
maxRL	Maximum number of radio links	8	
maxSCCPCH	Maximum number of secondary CCPCHs per cell	16	
maxDPDCH-UL	Maximum number of DPDCHs per cell	6	
maxDPCH-DLchan	Maximum number of channelisation codes used for DL DPCH	8	
maxPUSCH	Maximum number of PUSCHs	(8)	
maxPDSCH	Maximum number of PDSCHs	8	
maxPDSCHcodes	Maximum number of codes for PDSCH	16	
maxPDSCH-TFCIgroups	Maximum number of TFCI groups for PDSCH	256	
maxPDSCHcodeGroups	Maximum number of code groups for PDSCH	256	
maxPCPCHs	Maximum number of PCPCH channels in a CPCH Set	64	

Constant	Explanation	Value	Version
maxPCPCH-SF	Maximum number of available SFs on PCPCH	7	
maxTS	Maximum number of timeslots used in one direction (UL or DL)	14 (3.84 Mcps TDD)	
		6 (1.28 Mcps TDD)	REL-4
hiPUSCHidentities	Maximum number of PUSCH Identities	64	
hiPDSCHidentities	Maximum number of PDSCH Identities	64	
Measurement information			
maxTGPS	Maximum number of transmission gap pattern sequences	6	
maxAdditionalMeas	Maximum number of additional measurements for a given measurement identity	4	
maxMeasEvent	Maximum number of events that can be listed in measurement reporting criteria	8	
maxMeasParEvent	Maximum number of measurement parameters (e.g. thresholds) per event	2	
maxMeasIntervals	Maximum number of intervals that define the mapping function between the measurements for the cell quality Q of a cell and the representing quality value	1	
maxCellMeas	Maximum number of cells to measure	32	
maxReportedGSMCells	Maximum number of GSM cells to be reported	6	
maxFreq	Maximum number of frequencies to measure	8	
maxSat	Maximum number of satellites to measure	16	
HiRM	Maximum number that could be set as rate matching attribute for a transport channel	256	
Frequency information			
maxFDDFreqList	Maximum number of FDD carrier frequencies to be stored in USIM	4	
maxTDDFreqList	Maximum number of TDD carrier frequencies to be stored in USIM	4	
maxFDDFreqCellList	Maximum number of neighbouring FDD cells to be stored in USIM	32	
maxTDDFreqCellList	Maximum number of neighbouring TDD cells to be stored in USIM	32	
maxGSMCellList	Maximum number of GSM cells to be stored in USIM	32	
Other information			
maxNumGSMFreqRanges	Maximum number of GSM Frequency Ranges to store	32	
maxNumFDDFreqs	Maximum number of FDD centre frequencies to store	8	
maxNumTDDFreqs	Maximum number of TDD centre frequencies to store	8	
maxNumCDMA200Freqs	Maximum number of CDMA2000 centre frequencies to store	8	

11 Message and Information element abstract syntax (with ASN.1)

This clause contains definitions for RRC PDUs and IEs using a subset of ASN.1 as specified in [14]. PDU and IE definitions are grouped into separate ASN.1 modules.

11.0 General

Some messages and/or IEs may include one or more IEs with name "dummy" that are included only in the ASN.1. The UE should avoid sending information elements that are named "dummy" to UTRAN. Likewise, UTRAN should avoid sending IEs with name "dummy" to the UE. If the UE anyhow receives an information element named "dummy", it shall ignore the IE and process the rest of the message as if the IE was not included.

NOTE: An IE with name "dummy" concerns an information element that was (erroneously) included in a previous version of the specification and has been removed by replacing it with a dummy with same type.

If the abstract syntax of an IE is defined using the ASN.1 type "BIT STRING", and this IE corresponds to a functional IE definition in tabular format, in which the significance of bits is semantically defined, the following general rule shall be applied:

The bits in the ASN.1 bit string shall represent the semantics of the functional IE definition in decreasing order of bit significance;

- with the first (or leftmost) bit in the bit string representing the most significant bit; and
- with the last (or rightmost) bit in the bit string representing the least significant bit.

11.1 General message structure

```
Class-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    ActiveSetUpdate,
    ActiveSetUpdateComplete,
    ActiveSetUpdateFailure,
    AssistanceDataDelivery,
    CellChangeOrderFromUTRAN,
    CellChangeOrderFromUTRANFailure,
    CellUpdate,
    CellUpdateConfirm-CCCH,
    CellUpdateConfirm,
    CounterCheck,
    CounterCheckResponse,
    DownlinkDirectTransfer,
    HandoverToUTRANComplete,
    InitialDirectTransfer,
    HandoverFromUTRANCommand-GSM,
    HandoverFromUTRANCommand-CDMA2000,
    HandoverFromUTRANFailure,
    MeasurementControl,
    MeasurementControlFailure,
    MeasurementReport,
    PagingType1,
    PagingType2,
    PhysicalChannelReconfiguration,
    PhysicalChannelReconfigurationComplete,
    PhysicalChannelReconfigurationFailure,
    PhysicalSharedChannelAllocation,
    PUSCHCapacityRequest,
    RadioBearerReconfiguration,
    RadioBearerReconfigurationComplete,
    RadioBearerReconfigurationFailure,
    RadioBearerRelease,
    RadioBearerReleaseComplete,
    RadioBearerReleaseFailure,
    RadioBearerSetup,
    RadioBearerSetupComplete,
    RadioBearerSetupFailure,
    RRCConnectionReject,
    RRCConnectionRelease,
    RRCConnectionRelease-CCCH,
    RRCConnectionReleaseComplete,
    RRCConnectionRequest,
    RRCConnectionSetup,
    RRCConnectionSetupComplete,
    RRCStatus,
    SecurityModeCommand,
    SecurityModeComplete,
    SecurityModeFailure,
    SignallingConnectionRelease,
    SignallingConnectionReleaseIndication,
    SystemInformation-BCH,
    SystemInformation-FACH,
    SystemInformationChangeIndication,
```

```
	TransportChannelReconfiguration,
	TransportChannelReconfigurationComplete,
	TransportChannelReconfigurationFailure,
	TransportFormatCombinationControl,
	TransportFormatCombinationControlFailure,
	UECapabilityEnquiry,
	UECapabilityInformation,
	UECapabilityInformationConfirm,
	UplinkDirectTransfer,
	UplinkPhysicalChannelControl,
	URAUpdate,
	URAUpdateConfirm,
	URAUpdateConfirm-CCCH,
	UTRANMobilityInformation,
	UTRANMobilityInformationConfirm,
	UTRANMobilityInformationFailure
FROM PDU-definitions

-- User Equipment IEs :
	IntegrityCheckInfo
FROM InformationElements;

--**************************************************************
--
-- Downlink DCCH messages
--
--**************************************************************

DL-DCCH-Message ::= SEQUENCE {
	integrityCheckInfo		IntegrityCheckInfo		OPTIONAL,
	message					DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
	activeSetUpdate						ActiveSetUpdate,
	assistanceDataDelivery				AssistanceDataDelivery,
	cellChangeOrderFromUTRAN			CellChangeOrderFromUTRAN,
	cellUpdateConfirm					CellUpdateConfirm,
	counterCheck						CounterCheck,
	downlinkDirectTransfer				DownlinkDirectTransfer,
	handoverFromUTRANCommand-GSM		HandoverFromUTRANCommand-GSM,
	handoverFromUTRANCommand-CDMA2000	HandoverFromUTRANCommand-CDMA2000,
	measurementControl					MeasurementControl,
	pagingType2							PagingType2,
	physicalChannelReconfiguration		PhysicalChannelReconfiguration,
	physicalSharedChannelAllocation		PhysicalSharedChannelAllocation,
	radioBearerReconfiguration			RadioBearerReconfiguration,
	radioBearerRelease					RadioBearerRelease,
	radioBearerSetup					RadioBearerSetup,
	rrcConnectionRelease				RRCConnectionRelease,
	securityModeCommand					SecurityModeCommand,
	signallingConnectionRelease			SignallingConnectionRelease,
	transportChannelReconfiguration		TransportChannelReconfiguration,
	transportFormatCombinationControl	TransportFormatCombinationControl,
	ueCapabilityEnquiry					UECapabilityEnquiry,
	ueCapabilityInformationConfirm		UECapabilityInformationConfirm,
	uplinkPhysicalChannelControl		UplinkPhysicalChannelControl,
	uraUpdateConfirm					URAUpdateConfirm,
	utranMobilityInformation			UTRANMobilityInformation,
	extension							NULL
}

--**************************************************************
--
-- Uplink DCCH messages
--
--**************************************************************

UL-DCCH-Message ::= SEQUENCE {
	integrityCheckInfo		IntegrityCheckInfo		OPTIONAL,
	message					UL-DCCH-MessageType
}

UL-DCCH-MessageType ::= CHOICE {
	activeSetUpdateComplete				ActiveSetUpdateComplete,
	activeSetUpdateFailure				ActiveSetUpdateFailure,
	cellChangeOrderFromUTRANFailure		CellChangeOrderFromUTRANFailure,
	counterCheckResponse				CounterCheckResponse,
```

```
    handoverToUTRANComplete             HandoverToUTRANComplete,
    initialDirectTransfer               InitialDirectTransfer,
    handoverFromUTRANFailure            HandoverFromUTRANFailure,
    measurementControlFailure           MeasurementControlFailure,
    measurementReport                   MeasurementReport,
    physicalChannelReconfigurationComplete
                                        PhysicalChannelReconfigurationComplete,
    physicalChannelReconfigurationFailure
                                        PhysicalChannelReconfigurationFailure,
    radioBearerReconfigurationComplete  RadioBearerReconfigurationComplete,
    radioBearerReconfigurationFailure   RadioBearerReconfigurationFailure,
    radioBearerReleaseComplete          RadioBearerReleaseComplete,
    radioBearerReleaseFailure           RadioBearerReleaseFailure,
    radioBearerSetupComplete            RadioBearerSetupComplete,
    radioBearerSetupFailure             RadioBearerSetupFailure,
    rrcConnectionReleaseComplete        RRCConnectionReleaseComplete,
    rrcConnectionSetupComplete          RRCConnectionSetupComplete,
    rrcStatus                           RRCStatus,
    securityModeComplete                SecurityModeComplete,
    securityModeFailure                 SecurityModeFailure,
    signallingConnectionReleaseIndication
                                        SignallingConnectionReleaseIndication,
    transportChannelReconfigurationComplete
                                        TransportChannelReconfigurationComplete,
    transportChannelReconfigurationFailure
                                        TransportChannelReconfigurationFailure,
    transportFormatCombinationControlFailure
                                        TransportFormatCombinationControlFailure,
    ueCapabilityInformation             UECapabilityInformation,
    uplinkDirectTransfer                UplinkDirectTransfer,
    utranMobilityInformationConfirm     UTRANMobilityInformationConfirm,
    utranMobilityInformationFailure     UTRANMobilityInformationFailure,
    extension                           NULL
}

--**************************************************************
--
-- Downlink CCCH messages
--
--**************************************************************

DL-CCCH-Message ::= SEQUENCE {
    integrityCheckInfo      IntegrityCheckInfo      OPTIONAL,
    message                 DL-CCCH-MessageType
}

DL-CCCH-MessageType ::= CHOICE {
    cellUpdateConfirm                   CellUpdateConfirm-CCCH,
    rrcConnectionReject                 RRCConnectionReject,
    rrcConnectionRelease                RRCConnectionRelease-CCCH,
    rrcConnectionSetup                  RRCConnectionSetup,
    uraUpdateConfirm                    URAUpdateConfirm-CCCH,
    extension                           NULL
}

--**************************************************************
--
-- Uplink CCCH messages
--
--**************************************************************

UL-CCCH-Message ::= SEQUENCE {
    integrityCheckInfo      IntegrityCheckInfo      OPTIONAL,
    message                 UL-CCCH-MessageType
}

UL-CCCH-MessageType ::= CHOICE {
    cellUpdate                          CellUpdate,
    rrcConnectionRequest                RRCConnectionRequest,
    uraUpdate                           URAUpdate,
    extension                           NULL
}

--**************************************************************
--
-- PCCH messages
--
--**************************************************************
```

```
PCCH-Message ::= SEQUENCE {
    message             PCCH-MessageType
}

PCCH-MessageType ::= CHOICE {
    pagingType1                         PagingType1,
    extension                           NULL
}

--***************************************************************
--
-- Downlink SHCCH messages
--
--***************************************************************

DL-SHCCH-Message ::= SEQUENCE {
    message                 DL-SHCCH-MessageType
}

DL-SHCCH-MessageType ::= CHOICE {
    physicalSharedChannelAllocation     PhysicalSharedChannelAllocation,
    extension                           NULL
}

--***************************************************************
--
-- Uplink SHCCH messages
--
--***************************************************************

UL-SHCCH-Message ::= SEQUENCE {
    message                 UL-SHCCH-MessageType
}

UL-SHCCH-MessageType ::= CHOICE {
    puschCapacityRequest                PUSCHCapacityRequest,
    extension                           NULL
}


--***************************************************************
--
-- BCCH messages sent on FACH
--
--***************************************************************

BCCH-FACH-Message ::= SEQUENCE {
    message             BCCH-FACH-MessageType
}

BCCH-FACH-MessageType ::= CHOICE {
    systemInformation                   SystemInformation-FACH,
    systemInformationChangeIndication   SystemInformationChangeIndication,
    extension                           NULL
}

--***************************************************************
--
-- BCCH messages sent on BCH
--
--***************************************************************

BCCH-BCH-Message ::= SEQUENCE {
    message             SystemInformation-BCH
}

END
```

11.2 PDU definitions

```
--***************************************************************
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
```

```
--
--**************************************************************

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--**************************************************************
--
-- IE parameter types from other modules
--
--**************************************************************

IMPORTS

-- Core Network IEs :
    CN-DomainIdentity,
    CN-InformationInfo,
    CN-InformationInfoFull,
    NAS-Message,
    PagingRecordTypeID,
-- UTRAN Mobility IEs :
    URA-Identity,
-- User Equipment IEs :
    ActivationTime,
    C-RNTI,
    CapabilityUpdateRequirement,
    CapabilityUpdateRequirement-r4,
    CapabilityUpdateRequirement-r4-ext,
    CellUpdateCause,
    CipheringAlgorithm,
    CipheringModeInfo,
    EstablishmentCause,
    FailureCauseWithProtErr,
    FailureCauseWithProtErrTrId,
    InitialUE-Identity,
    IntegrityProtActivationInfo,
    IntegrityProtectionModeInfo,
    N-308,
    PagingCause,
    PagingRecordList,
    ProtocolErrorIndicator,
    ProtocolErrorIndicatorWithMoreInfo,
    Rb-timer-indicator,
    RedirectionInfo,
    RejectionCause,
    ReleaseCause,
    RRC-StateIndicator,
    RRC-TransactionIdentifier,
    SecurityCapability,
    START-Value,
    STARTList,
    U-RNTI,
    U-RNTI-Short,
    UE-RadioAccessCapability,
    UE-RadioAccessCapability-r4-ext,
    UE-RadioAccessCapability-v370ext,
    UE-RadioAccessCapability-v380ext,
    DL-PhysChCapabilityFDD-v380ext,
    UE-ConnTimersAndConstants,
    UE-SecurityInformation,
    URA-UpdateCause,
    UTRAN-DRX-CycleLengthCoefficient,
    WaitTime,
-- Radio Bearer IEs :
    DefaultConfigIdentity,
    DefaultConfigMode,
    DL-CounterSynchronisationInfo,
    PredefinedConfigIdentity,
    PredefinedConfigStatusList,
    RAB-Info,
    RAB-Info-Post,
    RAB-InformationList,
    RAB-InformationReconfigList,
    RAB-InformationSetupList,
    RAB-InformationSetupList-r4,
    RB-ActivationTimeInfoList,
    RB-COUNT-C-InformationList,
```

```
    RB-COUNT-C-MSB-InformationList,
    RB-IdentityList,
    RB-InformationAffectedList,
    RB-InformationReconfigList,
    RB-InformationReconfigList-r4,
    RB-InformationReleaseList,
    RB-WithPDCP-InfoList,   SRB-InformationSetupList,
    SRB-InformationSetupList2,
    UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
    CPCH-SetID,
    DL-AddReconfTransChInfo2List,
    DL-AddReconfTransChInfoList,
    DL-CommonTransChInfo,
    DL-CommonTransChInfo-r4,
    DL-DeletedTransChInfoList,
    DRAC-StaticInformationList,
    TFC-Subset,
    TFCS-Identity,
    UL-AddReconfTransChInfoList,
    UL-CommonTransChInfo,
    UL-DeletedTransChInfoList,
-- Physical Channel IEs :
    Alpha,
    CCTrCH-PowerControlInfo,
    CCTrCH-PowerControlInfo-r4,
    ConstantValue,
    CPCH-SetInfo,
    DL-CommonInformation,
    DL-CommonInformation-r4,
    DL-CommonInformationPost,
    DL-InformationPerRL,
    DL-InformationPerRL-List,
    DL-InformationPerRL-List-r4,
    DL-InformationPerRL-ListPostFDD,
    DL-InformationPerRL-PostTDD,
    DL-InformationPerRL-PostTDD-LCR-r4,
    DL-PDSCH-Information,
    DPCH-CompressedModeStatusInfo,
    FrequencyInfo,
    FrequencyInfoFDD,
    FrequencyInfoTDD,
    MaxAllowedUL-TX-Power,
    OpenLoopPowerControl-IPDL-TDD-r4,
    PDSCH-CapacityAllocationInfo,
    PDSCH-CapacityAllocationInfo-r4,
    PDSCH-Identity,
    PrimaryCCPCH-TX-Power,
    PUSCH-CapacityAllocationInfo,
    PUSCH-CapacityAllocationInfo-r4,
    PUSCH-Identity,
    RL-AdditionInformationList,
    RL-RemovalInformationList,
    SpecialBurstScheduling,
    SSDT-Information,
    TFC-ControlDuration,
    SSDT-UL-r4,
    TimeslotList,
    TimeslotList-r4,
    TX-DiversityMode,
    UL-ChannelRequirement,
    UL-ChannelRequirement-r4,
    UL-ChannelRequirementWithCPCH-SetID,
    UL-ChannelRequirementWithCPCH-SetID-r4,
    UL-DPCH-Info,
    UL-DPCH-Info-r4,
    UL-DPCH-InfoPostFDD,
    UL-DPCH-InfoPostTDD,
    UL-DPCH-InfoPostTDD-LCR-r4,
    UL-SynchronisationParameters-r4,
    UL-TimingAdvance,
    UL-TimingAdvanceControl,
    UL-TimingAdvanceControl-r4,
-- Measurement IEs :
    AdditionalMeasurementID-List,
    Frequency-Band,
    EventResults,
    InterFreqEventResults-LCR-r4-ext,
    InterRAT-TargetCellDescription,
```

```
    MeasuredResults,
    MeasuredResults-v390ext,
    MeasuredResultsList,
    MeasuredResultsList-LCR-r4-ext,
    MeasuredResultsOnRACH,
    MeasurementCommand,
    MeasurementCommand-r4,
    MeasurementIdentity,
    MeasurementReportingMode,
    PrimaryCCPCH-RSCP,
    TimeslotListWithISCP,
    TrafficVolumeMeasuredResultsList,
    UE-Positioning-GPS-AssistanceData,
    UE-Positioning-Measurement-v390ext,
    UE-Positioning-OTDOA-AssistanceData,
    UE-Positioning-OTDOA-AssistanceData-r4ext,
    UE-Positioning-OTDOA-AssistanceData-UEB,
    UE-Positioning-IPDL-Parameters-TDD-r4-ext,
-- Other IEs :
    BCCH-ModificationInfo,
    CDMA2000-MessageList,
    GSM-MessageList,
    InterRAT-ChangeFailureCause,
    InterRAT-HO-FailureCause,
    InterRAT-UE-RadioAccessCapabilityList,
    InterRAT-UE-SecurityCapList,
    IntraDomainNasNodeSelector,
    ProtocolErrorMoreInformation,
    Rplmn-Information,
    Rplmn-Information-r4,
    SegCount,
    SegmentIndex,
    SFN-Prime,
    SIB-Data-fixed,
    SIB-Data-variable,
    SIB-Type
FROM InformationElements

    maxSIBperMsg
FROM Constant-definitions;

-- ***************************************************
--
-- ACTIVE SET UPDATE (FDD only)
--
-- ***************************************************

ActiveSetUpdate ::= CHOICE {
    r3                              SEQUENCE {
        activeSetUpdate-r3              ActiveSetUpdate-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            activeSetUpdate-r4-ext          ActiveSetUpdate-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        } OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

ActiveSetUpdate-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        newU-RNTI                       U-RNTI                              OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- Radio bearer IEs
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Physical channel IEs
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        rl-AdditionInformationList      RL-AdditionInformationList          OPTIONAL,
        rl-RemovalInformationList       RL-RemovalInformationList           OPTIONAL,
        tx-DiversityMode                TX-DiversityMode                    OPTIONAL,
        ssdt-Information                SSDT-Information                    OPTIONAL
}
```

```
ActiveSetUpdate-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information. FDD only.
    ssdt-UL                             SSDT-UL-r4                              OPTIONAL
}


-- ***************************************************
--
-- ACTIVE SET UPDATE COMPLETE (FDD only)
--
-- ***************************************************

ActiveSetUpdateComplete ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
    -- Radio bearer IEs
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- ACTIVE SET UPDATE FAILURE (FDD only)
--
-- ***************************************************

ActiveSetUpdateFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- 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
}

 -- ***************************************************
--
-- CELL CHANGE ORDER FROM UTRAN
--
```

```
-- ***************************************************

CellChangeOrderFromUTRAN ::= CHOICE {
    r3                              SEQUENCE {
        cellChangeOrderFromUTRAN-IEs        CellChangeOrderFromUTRAN-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

CellChangeOrderFromUTRAN-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        -- not used in this release of the specification
        dummy                           IntegrityProtectionModeInfo         OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        rab-InformationList             RAB-InformationList                 OPTIONAL,
        interRAT-TargetCellDescription  InterRAT-TargetCellDescription
}

-- ***************************************************
--
-- CELL CHANGE ORDER FROM UTRAN FAILURE
--
-- ***************************************************

CellChangeOrderFromUTRANFailure ::= CHOICE {
    r3                              SEQUENCE {
        cellChangeOrderFromUTRANFailure-r3
                                        CellChangeOrderFromUTRANFailure-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
-- dummy is not used in this version of the protocol
    dummy                           SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

CellChangeOrderFromUTRANFailure-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        -- not used in this release of the specification
        dummy                           IntegrityProtectionModeInfo         OPTIONAL,
        interRAT-ChangeFailureCause     InterRAT-ChangeFailureCause
}

-- ***************************************************
--
-- CELL UPDATE
--
-- ***************************************************

CellUpdate ::= SEQUENCE {
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        startList       STARTList,
        am-RLC-ErrorIndicationRb2-3or4      BOOLEAN,
        am-RLC-ErrorIndicationRb5orAbove    BOOLEAN,
        cellUpdateCause                 CellUpdateCause,
        failureCause                    FailureCauseWithProtErrTrId         OPTIONAL,
        -- TABULAR: RRC transaction identifier is nested in FailureCauseWithProtErrTrId
        rb-timer-indicator              Rb-timer-indicator,
    -- Measurement IEs
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- CELL UPDATE CONFIRM
--
-- ***************************************************
```

```
CellUpdateConfirm ::= CHOICE {
    r3                              SEQUENCE {
        cellUpdateConfirm-r3            CellUpdateConfirm-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            cellUpdateConfirm-r3-r4-ext     CellUpdateConfirm-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }       OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                cellUpdateConfirm-r4            CellUpdateConfirm-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}
CellUpdateConfirm-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
        rlc-Re-establishIndicatorRb2-3or4       BOOLEAN,
        rlc-Re-establishIndicatorRb5orAbove     BOOLEAN,
 -- CN information elements
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        rb-InformationReleaseList       RB-InformationReleaseList           OPTIONAL,
        rb-InformationReconfigList      RB-InformationReconfigList          OPTIONAL,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList           OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList         OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement               OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation                OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List            OPTIONAL
}

CellUpdateConfirm-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

CellUpdateConfirm-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
```

```
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
        rlc-ResetIndicatorC-Plane       BOOLEAN,
        rlc-ResetIndicatorU-Plane       BOOLEAN,
 -- CN information elements
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        rb-InformationReleaseList       RB-InformationReleaseList           OPTIONAL,
        rb-InformationReconfigList      RB-InformationReconfigList-r4           OPTIONAL,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
        rb-WithPDCP-InfoList            RB-WithPDCP-InfoList                OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo-r4             OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList           OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList         OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement-r4            OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation-r4             OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4         OPTIONAL
}

-- ***************************************************
--
-- CELL UPDATE CONFIRM for CCCH
--
-- ***************************************************

CellUpdateConfirm-CCCH ::= CHOICE {
    r3                              SEQUENCE {
        -- User equipment IEs
            u-RNTI                      U-RNTI,
        -- The rest of the message is identical to the one sent on DCCH.
            cellUpdateConfirm-r3                CellUpdateConfirm-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            cellUpdateConfirm-r3-r4-ext     CellUpdateConfirm-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        u-RNTI                          U-RNTI,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                -- The rest of the message is identical to the one sent on DCCH.
                cellUpdateConfirm-r4            CellUpdateConfirm-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

-- ***************************************************
--
```

```
-- COUNTER CHECK
--
-- ***************************************************

CounterCheck ::= CHOICE {
    r3                              SEQUENCE {
        counterCheck-r3                 CounterCheck-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

CounterCheck-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Radio bearer IEs
        rb-COUNT-C-MSB-InformationList  RB-COUNT-C-MSB-InformationList
}

-- ***************************************************
--
-- COUNTER CHECK RESPONSE
--
-- ***************************************************

CounterCheckResponse ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Radio bearer IEs
        rb-COUNT-C-InformationList      RB-COUNT-C-InformationList          OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- DOWNLINK DIRECT TRANSFER
--
-- ***************************************************

DownlinkDirectTransfer ::= CHOICE {
    r3                              SEQUENCE {
        downlinkDirectTransfer-r3       DownlinkDirectTransfer-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

DownlinkDirectTransfer-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
        nas-Message                     NAS-Message
}

-- ***************************************************
--
-- HANDOVER TO UTRAN COMMAND
--
-- ***************************************************


HandoverToUTRANCommand ::= CHOICE {
    r3                              SEQUENCE {
        handoverToUTRANCommand-r3       HandoverToUTRANCommand-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            handoverToUTRANCommand-r3-r4-ext
                                            HandoverToUTRANCommand-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
```

```
    criticalExtensions              CHOICE {
        r4                              SEQUENCE {
            handoverToUTRANCommand-r4       HandoverToUTRANCommand-r4-IEs,
            nonCriticalExtensions           SEQUENCE {}     OPTIONAL
        },
        criticalExtensions              SEQUENCE {}
    }
}

HandoverToUTRANCommand-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        new-U-RNTI                      U-RNTI-Short,
        dummy                           ActivationTime                  OPTIONAL,
        cipheringAlgorithm              CipheringAlgorithm              OPTIONAL,
    -- Radio bearer IEs
    -- Specification mode information
        specificationMode               CHOICE {
            complete                        SEQUENCE {
                srb-InformationSetupList        SRB-InformationSetupList,
                rab-InformationSetupList        RAB-InformationSetupList            OPTIONAL,
                ul-CommonTransChInfo            UL-CommonTransChInfo,
                ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList,
                dl-CommonTransChInfo            DL-CommonTransChInfo,
                dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList,
                ul-DPCH-Info                    UL-DPCH-Info,
                modeSpecificInfo                CHOICE {
                    fdd                             SEQUENCE {
                        dl-PDSCH-Information            DL-PDSCH-Information OPTIONAL,
                        cpch-SetInfo                    CPCH-SetInfo        OPTIONAL
                    },
                    tdd                             NULL
                },
                dl-CommonInformation            DL-CommonInformation,
                dl-InformationPerRL-List        DL-InformationPerRL-List,
                frequencyInfo                   FrequencyInfo
            },
            preconfiguration                SEQUENCE {
-- All IEs that include an FDD/TDD choice are split in two IEs for this message,
-- one for the FDD only elements and one for the TDD only elements, so that one
-- FDD/TDD choice in this level is sufficient.
                preConfigMode                   CHOICE {
                    predefinedConfigIdentity        PredefinedConfigIdentity,
                    defaultConfig                   SEQUENCE {
                       defaultConfigMode                DefaultConfigMode,
                       defaultConfigIdentity            DefaultConfigIdentity
                    }
                },
                rab-Info                        RAB-Info-Post       OPTIONAL,
                modeSpecificInfo                CHOICE {
                    fdd                             SEQUENCE {
                        ul-DPCH-Info                    UL-DPCH-InfoPostFDD,
                        dl-CommonInformationPost        DL-CommonInformationPost,
                        dl-InformationPerRL-List        DL-InformationPerRL-ListPostFDD,
                        frequencyInfo                   FrequencyInfoFDD
                    },
                    tdd                                 SEQUENCE {
                        ul-DPCH-Info                    UL-DPCH-InfoPostTDD,
                        dl-CommonInformationPost        DL-CommonInformationPost,
                        dl-InformationPerRL             DL-InformationPerRL-PostTDD,
                        frequencyInfo                   FrequencyInfoTDD,
                        primaryCCPCH-TX-Power           PrimaryCCPCH-TX-Power
                    }

                }
            }
        },
    -- Physical channel IEs
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power
}

HandoverToUTRANCommand-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

HandoverToUTRANCommand-r4-IEs ::= SEQUENCE {
```

```
    -- User equipment IEs
        new-U-RNTI                      U-RNTI-Short,
        activationTime                  ActivationTime                      OPTIONAL,
        cipheringAlgorithm              CipheringAlgorithm                  OPTIONAL,
    -- Radio bearer IEs
        rab-Info                        RAB-Info-Post,
    -- Specification mode information
        specificationMode               CHOICE {
            complete                        SEQUENCE {
                srb-InformationSetupList        SRB-InformationSetupList,
                rab-InformationSetupList        RAB-InformationSetupList-r4         OPTIONAL,
                ul-CommonTransChInfo            UL-CommonTransChInfo,
                ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList,
                dl-CommonTransChInfo            DL-CommonTransChInfo,
                dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList,
                ul-DPCH-Info                    UL-DPCH-Info-r4,
                modeSpecificInfo                CHOICE {
                    fdd                             SEQUENCE {
                        dl-PDSCH-Information            DL-PDSCH-Information OPTIONAL,
                        cpch-SetInfo                    CPCH-SetInfo        OPTIONAL
                    },
                    tdd                             NULL
                },
                dl-CommonInformation            DL-CommonInformation-r4,
                dl-InformationPerRL-List        DL-InformationPerRL-List-r4,
                frequencyInfo                   FrequencyInfo
            },
            preconfiguration                SEQUENCE {
-- All IEs that include an FDD/TDD choice are split in two IEs for this message,
-- one for the FDD only elements and one for the TDD only elements, so that one
-- FDD/TDD choice in this level is sufficient.
                predefinedConfigIdentity        PredefinedConfigIdentity,
                rab-Info                        RAB-Info-Post       OPTIONAL,
                modeSpecificInfo                CHOICE {
                    fdd                             SEQUENCE {
                        ul-DPCH-Info                    UL-DPCH-InfoPostFDD,
                        dl-CommonInformationPost        DL-CommonInformationPost,
                        dl-InformationPerRL-List        DL-InformationPerRL-ListPostFDD,
                        frequencyInfo                   FrequencyInfoFDD
                    },
                    tdd                             CHOICE {
                        tdd384                          SEQUENCE {
                            ul-DPCH-Info                    UL-DPCH-InfoPostTDD,
                            dl-InformationPerRL             DL-InformationPerRL-PostTDD,
                            frequencyInfo                   FrequencyInfoTDD,
                            primaryCCPCH-TX-Power           PrimaryCCPCH-TX-Power
                        },
                        tdd128                          SEQUENCE {
                            ul-DPCH-Info                    UL-DPCH-InfoPostTDD-LCR-r4,
                            dl-InformationPerRL             DL-InformationPerRL-PostTDD-LCR-r4,
                            frequencyInfo                   FrequencyInfoTDD,
                            primaryCCPCH-TX-Power           PrimaryCCPCH-TX-Power
                        }
                    }
                }
            }
        },
    -- Physical channel IEs
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power
}

-- ***************************************************
--
-- HANDOVER TO UTRAN COMPLETE
--
-- ***************************************************

HandoverToUTRANComplete ::= SEQUENCE {
    --TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
    -- TABULAR: the IE below is conditional on history.
        startList                       STARTList                           OPTIONAL,
    -- Radio bearer IEs
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}
```

```
-- ***************************************************
--
-- INITIAL DIRECT TRANSFER
--
-- ***************************************************

InitialDirectTransfer ::= SEQUENCE {
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
        intraDomainNasNodeSelector      IntraDomainNasNodeSelector,
        nas-Message                     NAS-Message,
    -- Measurement IEs
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- HANDOVER FROM UTRAN COMMAND
--
-- ***************************************************

HandoverFromUTRANCommand-GSM ::= CHOICE {
    r3                              SEQUENCE {
        handoverFromUTRANCommand-GSM-r3
                                        HandoverFromUTRANCommand-GSM-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

HandoverFromUTRANCommand-GSM-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        activationTime                  ActivationTime                      OPTIONAL,
    -- Radio bearer IEs
        toHandover-Info                 RAB-Info                            OPTIONAL,
    -- Measurement IEs
        frequency-band                  Frequency-Band,
    -- Other IEs
        gsm-message                     CHOICE {
            single-GSM-Message              SEQUENCE {},
            -- In this case, what follows the basic production is a variable length bit string
            -- with no length field, containing the GSM message including GSM padding up to end
            -- of container, to be analysed according to GSM specifications
            gsm-MessageList                 SEQUENCE {
                gsm-Messages                    GSM-MessageList
            }
        }
}

HandoverFromUTRANCommand-CDMA2000 ::= CHOICE {
    r3                              SEQUENCE {
        handoverFromUTRANCommand-CDMA2000-r3
                                        HandoverFromUTRANCommand-CDMA2000-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

HandoverFromUTRANCommand-CDMA2000-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        activationTime                  ActivationTime                      OPTIONAL,
    -- Radio bearer IEs
        toHandover-Info                 RAB-Info                            OPTIONAL,
    -- Other IEs
        cdma2000-MessageList            CDMA2000-MessageList
}

-- ***************************************************
```

```
--
-- HANDOVER FROM UTRAN FAILURE
--
-- ***************************************************

HandoverFromUTRANFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Other IEs
        interRAT-HO-FailureCause        InterRAT-HO-FailureCause            OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- INTER RAT HANDOVER INFO
--
-- ***************************************************

InterRATHandoverInfo ::= SEQUENCE {
    -- This structure is defined for historical reasons, backward compatibility with 04.18
    predefinedConfigStatusList      CHOICE {
        absent                          NULL,
        present                         PredefinedConfigStatusList
    },
    uE-SecurityInformation          CHOICE {
        absent                          NULL,
        present                         UE-SecurityInformation
    },
    ue-CapabilityContainer          CHOICE {
        absent                          NULL,
        present                         OCTET STRING (SIZE (0..63))
        -- octet aligned string containing IE UE-RadioAccessCapabilityInfo
    },
    -- Non critical extensions
    v390NonCriticalExtensions       CHOICE {
        absent                          NULL,
        present                         SEQUENCE {
            interRATHandoverInfo-v390ext    InterRATHandoverInfo-v390ext-IEs,
            -- Reserved for future non critical extension
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }
    }
}

InterRATHandoverInfo-v390ext-IEs ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v380ext    UE-RadioAccessCapability-v380ext        OPTIONAL,
        dl-PhysChCapabilityFDD-v380ext      DL-PhysChCapabilityFDD-v380ext
}

-- ***************************************************
--
-- 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
}

 -- ***************************************************
--
-- PAGING TYPE 1
--
-- ***************************************************

PagingType1 ::= SEQUENCE {
    -- User equipment IEs
        pagingRecordList                PagingRecordList                    OPTIONAL,
    -- Other IEs
        bcch-ModificationInfo           BCCH-ModificationInfo               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- PAGING TYPE 2
--
-- ***************************************************

PagingType2 ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        pagingCause                     PagingCause,
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
        pagingRecordTypeID              PagingRecordTypeID,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- PHYSICAL CHANNEL RECONFIGURATION
--
-- ***************************************************

PhysicalChannelReconfiguration ::= CHOICE {
    r3                              SEQUENCE {
        physicalChannelReconfiguration-r3
                                        PhysicalChannelReconfiguration-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            physicalChannelReconfiguration-r3-r4-ext    PhysicalChannelReconfiguration-r3-r4-ext-
IEs,
            nonCriticalExtensions                   SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
            criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                physicalChannelReconfiguration-r4
                                                PhysicalChannelReconfiguration-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

PhysicalChannelReconfiguration-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
```

```
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirementWithCPCH-SetID     OPTIONAL,
        -- TABULAR: UL-ChannelRequirementWithCPCH-SetID contains the choice
        -- between UL DPCH info, CPCH SET info and CPCH set ID.
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation                OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List            OPTIONAL
}

PhysicalChannelReconfiguration-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

PhysicalChannelReconfiguration-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        rb-WithPDCP-InfoList            RB-WithPDCP-InfoList                OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirementWithCPCH-SetID-r4  OPTIONAL,
        -- TABULAR: UL-ChannelRequirementWithCPCH-SetID-r4 contains the choice
        -- between UL DPCH info, CPCH SET info and CPCH set ID.
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation-r4             OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4         OPTIONAL
}

-- ***************************************************
--
-- PHYSICAL CHANNEL RECONFIGURATION COMPLETE
--
-- ***************************************************

PhysicalChannelReconfigurationComplete ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
        -- TABULAR: UL-TimingAdvance is applicable for TDD mode only.
        ul-TimingAdvance                UL-TimingAdvance                    OPTIONAL,
    -- Radio bearer IEs
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}
```

```
-- ***************************************************
--
-- PHYSICAL CHANNEL RECONFIGURATION FAILURE
--
-- ***************************************************

PhysicalChannelReconfigurationFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier           OPTIONAL,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- PHYSICAL SHARED CHANNEL ALLOCATION (TDD only)
--
-- ***************************************************

PhysicalSharedChannelAllocation ::= CHOICE {
    r3                              SEQUENCE {
        physicalSharedChannelAllocation-r3
                                    PhysicalSharedChannelAllocation-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        c-RNTI                          C-RNTI                              OPTIONAL,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                physicalSharedChannelAllocation-r4
                                                PhysicalSharedChannelAllocation-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

PhysicalSharedChannelAllocation-r3-IEs ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        c-RNTI                          C-RNTI                              OPTIONAL,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Physical channel IEs
        ul-TimingAdvance                UL-TimingAdvanceControl             OPTIONAL,
        pusch-CapacityAllocationInfo    PUSCH-CapacityAllocationInfo        OPTIONAL,
        pdsch-CapacityAllocationInfo    PDSCH-CapacityAllocationInfo        OPTIONAL,
        confirmRequest                  ENUMERATED {
                                            confirmPDSCH, confirmPUSCH }    OPTIONAL,
        -- TABULAR: If the above value is not present, the default value "No Confirm"
        -- shall be used as specified in 10.2.25.
        trafficVolumeReportRequest      INTEGER (0..255)                    OPTIONAL,
        iscpTimeslotList                    TimeslotList                        OPTIONAL,
        requestPCCPCHRSCP                   BOOLEAN
}

PhysicalSharedChannelAllocation-r4-IEs ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- Physical channel IEs
        ul-TimingAdvance                UL-TimingAdvanceControl-r4          OPTIONAL,
        pusch-CapacityAllocationInfo    PUSCH-CapacityAllocationInfo-r4     OPTIONAL,
        pdsch-CapacityAllocationInfo    PDSCH-CapacityAllocationInfo-r4     OPTIONAL,
        confirmRequest                  ENUMERATED {
                                            confirmPDSCH, confirmPUSCH }    OPTIONAL,
        -- TABULAR: If the above value is not present, the default value "No Confirm"
        -- shall be used as specified in 10.2.25.
        iscpTimeslotList                TimeslotList-r4                     OPTIONAL,
        requestPCCPCHRSCP               BOOLEAN
}

-- ***************************************************
--
-- PUSCH CAPACITY REQUEST (TDD only)
--
-- ***************************************************
```

```
PUSCHCapacityRequest ::= SEQUENCE {
    -- User equipment IEs
        c-RNTI                          C-RNTI                                  OPTIONAL,
    -- Measurement IEs
        trafficVolume                   TrafficVolumeMeasuredResultsList,
        timeslotListWithISCP            TimeslotListWithISCP                    OPTIONAL,
        primaryCCPCH-RSCP               PrimaryCCPCH-RSCP                       OPTIONAL,
        allocationConfirmation          CHOICE {
            pdschConfirmation               PDSCH-Identity,
            puschConfirmation               PUSCH-Identity
        }                                                                       OPTIONAL,
        protocolErrorIndicator          ProtocolErrorIndicatorWithMoreInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RECONFIGURATION
--
-- ***************************************************

RadioBearerReconfiguration ::= CHOICE {
    r3                              SEQUENCE {
        radioBearerReconfiguration-r3   RadioBearerReconfiguration-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            radioBearerReconfiguration-r3-r4-ext
                                                RadioBearerReconfiguration-r3-r4-ext-IEs,
            nonCriticalExtensions               SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                radioBearerReconfiguration-r4   RadioBearerReconfiguration-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

RadioBearerReconfiguration-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo             OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                       OPTIONAL,
        activationTime                  ActivationTime                          OPTIONAL,
        new-U-RNTI                      U-RNTI                                  OPTIONAL,
        new-C-RNTI                      C-RNTI                                  OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient        OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                      OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                            OPTIONAL,
    -- Radio bearer IEs
        rab-InformationReconfigList     RAB-InformationReconfigList             OPTIONAL,
        rb-InformationReconfigList      RB-InformationReconfigList,
    -- NOTE: IE rb-InformationReconfigList should be optional in later versions of this message
        rb-InformationAffectedList      RB-InformationAffectedList              OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                    OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList               OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList             OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                      OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList      OPTIONAL
            },
            tdd                             NULL
        }                                                                       OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo                    OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList               OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfo2List            OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                           OPTIONAL,
```

```
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement               OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation                OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List
    -- NOTE: IE dl-InformationPerRL-List should be optional in later versions of this message
}

RadioBearerReconfiguration-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

RadioBearerReconfiguration-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        rab-InformationReconfigList     RAB-InformationReconfigList         OPTIONAL,
        rb-InformationReconfigList      RB-InformationReconfigList-r4       OPTIONAL,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        }                                                                   OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo-r4             OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList           OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfo2List        OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement-r4            OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation-r4             OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4         OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RECONFIGURATION COMPLETE
--
-- ***************************************************

RadioBearerReconfigurationComplete ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
        -- TABULAR: UL-TimingAdvance is applicable for TDD mode only.
        ul-TimingAdvance                UL-TimingAdvance                    OPTIONAL,
    -- Radio bearer IEs
```

```
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RECONFIGURATION FAILURE
--
-- ***************************************************

RadioBearerReconfigurationFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Radio bearer IEs
        potentiallySuccesfulBearerList  RB-IdentityList                     OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RELEASE
--
-- ***************************************************

RadioBearerRelease ::= CHOICE {
    r3                              SEQUENCE {
        radioBearerRelease-r3           RadioBearerRelease-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            radioBearerRelease-r3-r4-ext    RadioBearerRelease-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                radioBearerRelease-r4           RadioBearerRelease-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

RadioBearerRelease-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
        signallingConnectionRelIndication   CN-DomainIdentity               OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        rab-InformationReconfigList     RAB-InformationReconfigList         OPTIONAL,
        rb-InformationReleaseList       RB-InformationReleaseList,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
```

```
            tdd                             NULL
        }                                                               OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo            OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList       OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfo2List    OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                   OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power           OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement           OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information    OPTIONAL
            },
            tdd                         NULL
        },
        dl-CommonInformation            DL-CommonInformation            OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List        OPTIONAL
}

RadioBearerRelease-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                      OPTIONAL
}

RadioBearerRelease-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        integrityProtectionModeInfo     IntegrityProtectionModeInfo     OPTIONAL,
        cipheringModeInfo               CipheringModeInfo               OPTIONAL,
        activationTime                  ActivationTime                  OPTIONAL,
        new-U-RNTI                      U-RNTI                          OPTIONAL,
        new-C-RNTI                      C-RNTI                          OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo              OPTIONAL,
        signallingConnectionRelIndication   CN-DomainIdentity           OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                    OPTIONAL,
    -- Radio bearer IEs
        rab-InformationReconfigList     RAB-InformationReconfigList     OPTIONAL,
        rb-InformationReleaseList       RB-InformationReleaseList,
        rb-InformationAffectedList      RB-InformationAffectedList      OPTIONAL,
        rb-WithPDCP-InfoList            RB-WithPDCP-InfoList            OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo            OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList       OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList     OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID              OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        }                                                               OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo-r4         OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList       OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfo2List    OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                   OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power           OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement-r4        OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information    OPTIONAL
            },
            tdd                         NULL
        },
        dl-CommonInformation            DL-CommonInformation-r4         OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4     OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RELEASE COMPLETE
--
-- ***************************************************
```

```
RadioBearerReleaseComplete ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
        -- TABULAR: UL-TimingAdvance is applicable for TDD mode only.
        ul-TimingAdvance                UL-TimingAdvance                    OPTIONAL,
    -- Radio bearer IEs
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER RELEASE FAILURE
--
-- ***************************************************

RadioBearerReleaseFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Radio bearer IEs
        potentiallySuccesfulBearerList  RB-IdentityList                     OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER SETUP
--
-- ***************************************************

RadioBearerSetup ::= CHOICE {
    r3                              SEQUENCE {
        radioBearerSetup-r3             RadioBearerSetup-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            radioBearerSetup-r3-r4-ext          RadioBearerSetup-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                radioBearerSetup-r4             RadioBearerSetup-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

RadioBearerSetup-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- Radio bearer IEs
        srb-InformationSetupList        SRB-InformationSetupList            OPTIONAL,
        rab-InformationSetupList        RAB-InformationSetupList            OPTIONAL,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
```

```
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        }                                                                   OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList           OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList         OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement               OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation                OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List            OPTIONAL
}

RadioBearerSetup-r3-r4-ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

RadioBearerSetup-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- Radio bearer IEs
        srb-InformationSetupList        SRB-InformationSetupList            OPTIONAL,
        rab-InformationSetupList        RAB-InformationSetupList-r4         OPTIONAL,
        rb-InformationAffectedList      RB-InformationAffectedList          OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-deletedTransChInfoList       UL-DeletedTransChInfoList           OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificTransChInfo         CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                addReconfTransChDRAC-Info       DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        }                                                                   OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo-r4             OPTIONAL,
        dl-DeletedTransChInfoList       DL-DeletedTransChInfoList           OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList         OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement-r4            OPTIONAL,
        modeSpecificPhysChInfo          CHOICE {
            fdd                             SEQUENCE {
                dl-PDSCH-Information            DL-PDSCH-Information        OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonInformation            DL-CommonInformation-r4             OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4         OPTIONAL
}
```

```
-- ***************************************************
--
-- RADIO BEARER SETUP COMPLETE
--
-- ***************************************************

RadioBearerSetupComplete ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
        -- TABULAR: UL-TimingAdvance is applicable for TDD mode only.
        ul-TimingAdvance                UL-TimingAdvance                    OPTIONAL,
        start-Value             START-Value                                 OPTIONAL,
    -- Radio bearer IEs
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- RADIO BEARER SETUP FAILURE
--
-- ***************************************************

RadioBearerSetupFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Radio bearer IEs
        potentiallySuccesfulBearerList  RB-IdentityList                     OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- RRC CONNECTION REJECT
--
-- ***************************************************

RRCConnectionReject ::= CHOICE {
    r3                              SEQUENCE {
        rrcConnectionReject-r3          RRCConnectionReject-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        initialUE-Identity              InitialUE-Identity,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

RRCConnectionReject-r3-IEs ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        initialUE-Identity              InitialUE-Identity,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        rejectionCause                  RejectionCause,
        waitTime                        WaitTime,
        redirectionInfo                 RedirectionInfo                     OPTIONAL
}

-- ***************************************************
--
-- RRC CONNECTION RELEASE
--
-- ***************************************************

RRCConnectionRelease ::= CHOICE {
    r3                              SEQUENCE {
        rrcConnectionRelease-r3         RRCConnectionRelease-r3-IEs,
        nonCriticalExtensions           SEQUENCE {} OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
```

```
		criticalExtensions				CHOICE {
			r4								SEQUENCE {
				rrcConnectionRelease-r4			RRCConnectionRelease-r4-IEs,
				nonCriticalExtensions			SEQUENCE {}		OPTIONAL
			},
			criticalExtensions				SEQUENCE {}
		}
	}
}

RRCConnectionRelease-r3-IEs ::= SEQUENCE {
	-- User equipment IEs
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		n-308							N-308								OPTIONAL,
		-- The IE above is conditional on the UE state.
		releaseCause					ReleaseCause,
		rplmn-information				Rplmn-Information					OPTIONAL
}

RRCConnectionRelease-r4-IEs ::= SEQUENCE {
	-- User equipment IEs
		n-308							N-308								OPTIONAL,
		-- The IE above is conditional on the UE state.
		releaseCause					ReleaseCause,
		rplmn-information				Rplmn-Information-r4				OPTIONAL
}

-- ***************************************************
--
-- RRC CONNECTION RELEASE for CCCH
--
-- ***************************************************

RRCConnectionRelease-CCCH ::= CHOICE {
	r3								SEQUENCE {
		rrcConnectionRelease-CCCH-r3	RRCConnectionRelease-CCCH-r3-IEs,
		nonCriticalExtensions			SEQUENCE {} OPTIONAL
	},
	later-than-r3					SEQUENCE {
		u-RNTI							U-RNTI,
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		criticalExtensions				CHOICE {
			r4								SEQUENCE {
				rrcConnectionRelease-CCCH-r4	RRCConnectionRelease-CCCH-r4-IEs,
				nonCriticalExtensions			SEQUENCE {}		OPTIONAL
			},
			criticalExtensions				SEQUENCE {}
		}
	}
}

RRCConnectionRelease-CCCH-r3-IEs ::= SEQUENCE {
	-- User equipment IEs
		u-RNTI							U-RNTI,
	-- The rest of the message is identical to the one sent on DCCH.
		rrcConnectionRelease			RRCConnectionRelease-r3-IEs
}

RRCConnectionRelease-CCCH-r4-IEs ::= SEQUENCE {
	-- The rest of the message is identical to the one sent on DCCH.
		rrcConnectionRelease			RRCConnectionRelease-r4-IEs
}

-- ***************************************************
--
-- RRC CONNECTION RELEASE COMPLETE
--
-- ***************************************************

RRCConnectionReleaseComplete ::= SEQUENCE {
	-- User equipment IEs
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		errorIndication					FailureCauseWithProtErr				OPTIONAL,
	-- Extension mechanism for non- release99 information
		nonCriticalExtensions			SEQUENCE {}		OPTIONAL
}

-- ***************************************************
```

```
--
-- RRC CONNECTION REQUEST
--
-- ***************************************************

RRCConnectionRequest ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        initialUE-Identity              InitialUE-Identity,
        establishmentCause              EstablishmentCause,
        protocolErrorIndicator          ProtocolErrorIndicator,
        -- The IE above is MD, but for compactness reasons no default value
        -- has been assigned to it.
    -- Measurement IEs
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- RRC CONNECTION SETUP
--
-- ***************************************************

RRCConnectionSetup ::= CHOICE {
    r3                              SEQUENCE {
        rrcConnectionSetup-r3           RRCConnectionSetup-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            rrcConnectionSetup-r3-r4-ext    RRCConnectionSetup-r3-r4-ext-IEs,
        -- Extension mechanism for non- release99 information
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        initialUE-Identity              InitialUE-Identity,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                rrcConnectionSetup-r4           RRCConnectionSetup-r4-IEs,
                nonCriticalExtensions           SEQUENCE {}     OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

RRCConnectionSetup-r3-IEs ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        initialUE-Identity              InitialUE-Identity,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI,
        new-c-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient,
        capabilityUpdateRequirement     CapabilityUpdateRequirement         OPTIONAL,
        -- TABULAR: If the IE is not present, the default value defined in 10.3.3.2 shall
        -- be used.
    -- Radio bearer IEs
        srb-InformationSetupList        SRB-InformationSetupList2,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList,
    -- NOTE: IE ul-AddReconfTransChInfoList should be optional in later versions of this message
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList,
    -- NOTE: IE dl-AddReconfTransChInfoList should be optional in later versions of this message
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement               OPTIONAL,
        dl-CommonInformation            DL-CommonInformation                OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List            OPTIONAL
}

RRCConnectionSetup-r3-r4-ext-IEs ::= SEQUENCE {
```

```
    capabilityUpdateRequirement-r4-ext  CapabilityUpdateRequirement-r4-ext  OPTIONAL,
    -- Physical channel IEs
    -- The following IE extends SSDT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL                             SSDT-UL-r4                          OPTIONAL
}

RRCConnectionSetup-r4-IEs ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
        activationTime                  ActivationTime                      OPTIONAL,
        new-U-RNTI                      U-RNTI,
        new-c-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient,
        capabilityUpdateRequirement     CapabilityUpdateRequirement-r4      OPTIONAL,
        -- TABULAR: If the IE is not present, the default value defined in 10.3.3.2 shall
        -- be used.
    -- Radio bearer IEs
        srb-InformationSetupList        SRB-InformationSetupList2,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList         OPTIONAL,
        dl-CommonTransChInfo            DL-CommonTransChInfo-r4             OPTIONAL,
        dl-AddReconfTransChInfoList     DL-AddReconfTransChInfoList         OPTIONAL,
    -- Physical channel IEs
        frequencyInfo                   FrequencyInfo                       OPTIONAL,
        maxAllowedUL-TX-Power           MaxAllowedUL-TX-Power               OPTIONAL,
        ul-ChannelRequirement           UL-ChannelRequirement-r4            OPTIONAL,
        dl-CommonInformation            DL-CommonInformation-r4             OPTIONAL,
        dl-InformationPerRL-List        DL-InformationPerRL-List-r4         OPTIONAL
}

-- ***************************************************
--
-- RRC CONNECTION SETUP COMPLETE
--
-- ***************************************************

RRCConnectionSetupComplete ::= SEQUENCE {
    -- TABULAR: Integrity protection shall not be performed on this message.
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        startList                       STARTList,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
    -- Non critical extensions
        v370NonCriticalExtensions           SEQUENCE {
            rrcConnectionSetupComplete-v370ext  RRCConnectionSetupComplete-v370ext,
            v380NonCriticalExtensions           SEQUENCE {
                rrcConnectionSetupComplete-v380ext  RRCConnectionSetupComplete-v380ext-IEs,
                -- Reserved for future non critical extension
                v4NonCriticalExtensions         SEQUENCE {
                    rrcConnectionSetupComplete-r3-r4-ext
                                                RRCConnectionSetupComplete-r3-r4-ext-IEs,
                    nonCriticalExtensions-r4        SEQUENCE {}     OPTIONAL
                }       OPTIONAL
            }       OPTIONAL
        }       OPTIONAL
}

RRCConnectionSetupComplete-v370ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370ext    UE-RadioAccessCapability-v370ext    OPTIONAL
}

RRCConnectionSetupComplete-v380ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v380ext    UE-RadioAccessCapability-v380ext        OPTIONAL,
    dl-PhysChCapabilityFDD-v380ext          DL-PhysChCapabilityFDD-v380ext
}

RRCConnectionSetupComplete-r3-r4-ext-IEs ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-r4-ext     UE-RadioAccessCapability-r4-ext     OPTIONAL
}

-- ***************************************************
```

```
--
-- RRC FAILURE INFO
--
-- ***************************************************

RRC-FailureInfo ::= CHOICE {
    r3                                          SEQUENCE {
        rRC-FailureInfo-r3                          RRC-FailureInfo-r3-IEs,
        nonCriticalExtensions                       SEQUENCE {} OPTIONAL
    },
    criticalExtensions                          SEQUENCE {}
}

RRC-FailureInfo-r3-IEs ::=      SEQUENCE {
    -- Non-RRC IEs
        failureCauseWithProtErr                         FailureCauseWithProtErr
}

-- ***************************************************
--
-- RRC STATUS
--
-- ***************************************************

RRCStatus ::= SEQUENCE {
    -- Other IEs
        protocolErrorInformation        ProtocolErrorMoreInformation,
    -- TABULAR:  Identification of received message is nested in
    -- ProtocolErrorMoreInformation
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- SECURITY MODE COMMAND
--
-- ***************************************************

SecurityModeCommand ::= CHOICE {
    r3                              SEQUENCE {
        securityModeCommand-r3          SecurityModeCommand-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

SecurityModeCommand-r3-IEs ::= SEQUENCE {
-- TABULAR: Integrity protection shall always be performed on this message.
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        securityCapability              SecurityCapability,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
    --  Other IEs
        ue-SystemSpecificSecurityCap    InterRAT-UE-SecurityCapList         OPTIONAL
}

-- ***************************************************
--
-- SECURITY MODE COMPLETE
--
-- ***************************************************

SecurityModeComplete ::= SEQUENCE {
-- TABULAR: Integrity protection shall always be performed on this message.

    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
    -- Radio bearer IEs
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
    -- Extension mechanism for non- release99 information
```

```
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- SECURITY MODE FAILURE
--
-- ***************************************************

SecurityModeFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- SIGNALLING CONNECTION RELEASE
--
-- ***************************************************

SignallingConnectionRelease ::= CHOICE {
    r3                              SEQUENCE {
        signallingConnectionRelease-r3  SignallingConnectionRelease-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

SignallingConnectionRelease-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity
}

-- ***************************************************
--
-- SIGNALLING CONNECTION RELEASE INDICATION
--
-- ***************************************************

SignallingConnectionReleaseIndication ::= SEQUENCE {
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- SYSTEM INFORMATION for BCH
--
-- ***************************************************

SystemInformation-BCH ::= SEQUENCE {
    -- Other information elements
        sfn-Prime                       SFN-Prime,
        payload                         CHOICE {
            noSegment                       NULL,
            firstSegment                    FirstSegment,
            subsequentSegment               SubsequentSegment,
            lastSegmentShort                        LastSegmentShort,
            lastAndFirst                    SEQUENCE {
                lastSegmentShort                LastSegmentShort,
                firstSegment                    FirstSegmentShort
            },
            lastAndComplete                 SEQUENCE {
                lastSegmentShort                LastSegmentShort,
                completeSIB-List                CompleteSIB-List
            },
            lastAndCompleteAndFirst         SEQUENCE {
                lastSegmentShort                LastSegmentShort,
```

```
                completeSIB-List                CompleteSIB-List,
                firstSegment                    FirstSegmentShort
            },
            completeSIB-List                CompleteSIB-List,
            completeAndFirst                SEQUENCE {
                completeSIB-List                CompleteSIB-List,
                firstSegment                    FirstSegmentShort
            },
            completeSIB                     CompleteSIB,
            lastSegment                     LastSegment
        }
}

-- ***************************************************
--
-- SYSTEM INFORMATION for FACH
--
-- ***************************************************

SystemInformation-FACH ::= SEQUENCE {
    -- Other information elements
        payload                         CHOICE {
            noSegment                       NULL,
            firstSegment                    FirstSegment,
            subsequentSegment               SubsequentSegment,
            lastSegmentShort                LastSegmentShort,
            lastAndFirst                    SEQUENCE {
                lastSegmentShort                LastSegmentShort,
                firstSegment                    FirstSegmentShort
            },
            lastAndComplete                 SEQUENCE {
                lastSegmentShort                LastSegmentShort,
                completeSIB-List                CompleteSIB-List
            },
            lastAndCompleteAndFirst         SEQUENCE {
                lastSegmentShort                LastSegmentShort,
                completeSIB-List                CompleteSIB-List,
                firstSegment                    FirstSegmentShort
            },
            completeSIB-List                CompleteSIB-List,
            completeAndFirst                SEQUENCE {
                completeSIB-List                CompleteSIB-List,
                firstSegment                    FirstSegmentShort
            },
            completeSIB                     CompleteSIB,
            lastSegment                     LastSegment
        }
}

-- ***************************************************
--
-- First segment
--
-- ***************************************************

FirstSegment ::=                    SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        seg-Count                       SegCount,
        sib-Data-fixed                  SIB-Data-fixed
}

-- ***************************************************
--
-- First segment (short)
--
-- ***************************************************

FirstSegmentShort ::=               SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        seg-Count                       SegCount,
        sib-Data-variable               SIB-Data-variable
}

-- ***************************************************
--
-- Subsequent segment
```

```
--
-- ***************************************************

SubsequentSegment ::=              SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        segmentIndex                    SegmentIndex,
        sib-Data-fixed                  SIB-Data-fixed
}

-- ***************************************************
--
-- Last segment
--
-- ***************************************************

LastSegment ::=                    SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        segmentIndex                    SegmentIndex,
        sib-Data-fixed                  SIB-Data-fixed
    -- In case the SIB data is less than 222 bits, padding shall be used
    -- The same padding bits shall be used as defined in clause 12.1
}

LastSegmentShort ::=                       SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        segmentIndex                    SegmentIndex,
        sib-Data-variable               SIB-Data-variable
}

-- ***************************************************
--
-- Complete SIB
--
-- ***************************************************

CompleteSIB-List ::=               SEQUENCE (SIZE (1..maxSIBperMsg)) OF
                                        CompleteSIBshort

CompleteSIB ::=                    SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        sib-Data-fixed                  BIT STRING (SIZE (226))
    -- In case the SIB data is less than 226 bits, padding shall be used
    -- The same padding bits shall be used as defined in clause 12.1
}

CompleteSIBshort ::=                       SEQUENCE {
    -- Other information elements
        sib-Type                        SIB-Type,
        sib-Data-variable               SIB-Data-variable
}

-- ***************************************************
--
-- SYSTEM INFORMATION CHANGE INDICATION
--
-- ***************************************************

SystemInformationChangeIndication ::=   SEQUENCE {
    -- Other IEs
        bcch-ModificationInfo               BCCH-ModificationInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- TRANSPORT CHANNEL RECONFIGURATION
--
-- ***************************************************

TransportChannelReconfiguration ::= CHOICE {
    r3                             SEQUENCE {
        transportChannelReconfiguration-r3
                                        TransportChannelReconfiguration-r3-IEs,
```

```
		nonCriticalExtensions			SEQUENCE {
			transportChannelReconfiguration-r3-r4-ext
											TransportChannelReconfiguration-r3-r4-ext-IEs,
			nonCriticalExtensions			SEQUENCE {} OPTIONAL
		}		OPTIONAL
	},
	later-than-r3					SEQUENCE {
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		criticalExtensions				CHOICE {
			r4								SEQUENCE {
				transportChannelReconfiguration-r4
												TransportChannelReconfiguration-r4-IEs,
				nonCriticalExtensions			SEQUENCE {}		OPTIONAL
			},
			criticalExtensions				SEQUENCE {}
		}
	}
}

TransportChannelReconfiguration-r3-IEs ::= SEQUENCE {
	-- User equipment IEs
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		integrityProtectionModeInfo		IntegrityProtectionModeInfo			OPTIONAL,
		cipheringModeInfo				CipheringModeInfo					OPTIONAL,
		activationTime					ActivationTime						OPTIONAL,
		new-U-RNTI						U-RNTI								OPTIONAL,
		new-C-RNTI						C-RNTI								OPTIONAL,
		rrc-StateIndicator				RRC-StateIndicator,
		utran-DRX-CycleLengthCoeff		UTRAN-DRX-CycleLengthCoefficient	OPTIONAL,
	-- Core network IEs
		cn-InformationInfo				CN-InformationInfo					OPTIONAL,
	-- UTRAN mobility IEs
		ura-Identity					URA-Identity						OPTIONAL,
	-- Radio bearer IEs
		dl-CounterSynchronisationInfo	DL-CounterSynchronisationInfo		OPTIONAL,
	-- Transport channel IEs
		ul-CommonTransChInfo			UL-CommonTransChInfo				OPTIONAL,
		ul-AddReconfTransChInfoList		UL-AddReconfTransChInfoList			OPTIONAL,
		modeSpecificTransChInfo			CHOICE {
			fdd								SEQUENCE {
				cpch-SetID						CPCH-SetID						OPTIONAL,
				addReconfTransChDRAC-Info		DRAC-StaticInformationList	OPTIONAL
			},
			tdd								NULL
		}																	OPTIONAL,
		dl-CommonTransChInfo			DL-CommonTransChInfo				OPTIONAL,
		dl-AddReconfTransChInfoList		DL-AddReconfTransChInfoList			OPTIONAL,
	-- Physical channel IEs
		frequencyInfo					FrequencyInfo						OPTIONAL,
		maxAllowedUL-TX-Power			MaxAllowedUL-TX-Power				OPTIONAL,
		ul-ChannelRequirement			UL-ChannelRequirement				OPTIONAL,
		modeSpecificPhysChInfo			CHOICE {
			fdd								SEQUENCE {
				dl-PDSCH-Information				DL-PDSCH-Information		OPTIONAL
			},
			tdd							NULL
		},
		dl-CommonInformation			DL-CommonInformation				OPTIONAL,
		dl-InformationPerRL-List		DL-InformationPerRL-List			OPTIONAL
}

TransportChannelReconfiguration-r3-r4-ext-IEs ::= SEQUENCE {
	-- Physical channel IEs
	-- The following IE extends SSDT-Information, which is included in
	-- DL-CommonInformation. FDD only.
	ssdt-UL							SSDT-UL-r4							OPTIONAL
}

TransportChannelReconfiguration-r4-IEs ::= SEQUENCE {
	-- User equipment IEs
		integrityProtectionModeInfo		IntegrityProtectionModeInfo			OPTIONAL,
		cipheringModeInfo				CipheringModeInfo					OPTIONAL,
		activationTime					ActivationTime						OPTIONAL,
		new-U-RNTI						U-RNTI								OPTIONAL,
		new-C-RNTI						C-RNTI								OPTIONAL,
		rrc-StateIndicator				RRC-StateIndicator,
		utran-DRX-CycleLengthCoeff		UTRAN-DRX-CycleLengthCoefficient	OPTIONAL,
	-- Core network IEs
```

```
		cn-InformationInfo				CN-InformationInfo					OPTIONAL,
	-- UTRAN mobility IEs
		ura-Identity					URA-Identity						OPTIONAL,
	-- Radio bearer IEs
		rb-WithPDCP-InfoList			RB-WithPDCP-InfoList				OPTIONAL,
	-- Transport channel IEs
		ul-CommonTransChInfo			UL-CommonTransChInfo				OPTIONAL,
		ul-AddReconfTransChInfoList		UL-AddReconfTransChInfoList			OPTIONAL,
		modeSpecificTransChInfo			CHOICE {
			fdd								SEQUENCE {
				cpch-SetID						CPCH-SetID						OPTIONAL,
				addReconfTransChDRAC-Info		DRAC-StaticInformationList	OPTIONAL
			},
			tdd								NULL
		}																	OPTIONAL,
		dl-CommonTransChInfo			DL-CommonTransChInfo-r4				OPTIONAL,
		dl-AddReconfTransChInfoList		DL-AddReconfTransChInfoList			OPTIONAL,
	-- Physical channel IEs
		frequencyInfo					FrequencyInfo						OPTIONAL,
		maxAllowedUL-TX-Power			MaxAllowedUL-TX-Power				OPTIONAL,
		ul-ChannelRequirement			UL-ChannelRequirement-r4			OPTIONAL,
		modeSpecificPhysChInfo			CHOICE {
			fdd								SEQUENCE {
				dl-PDSCH-Information			DL-PDSCH-Information		OPTIONAL
			},
			tdd							NULL
		},
		dl-CommonInformation			DL-CommonInformation-r4				OPTIONAL,
		dl-InformationPerRL-List		DL-InformationPerRL-List-r4			OPTIONAL
}

-- ***************************************************
--
-- TRANSPORT CHANNEL RECONFIGURATION COMPLETE
--
-- ***************************************************

TransportChannelReconfigurationComplete ::= SEQUENCE {
	-- User equipment IEs
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		ul-IntegProtActivationInfo		IntegrityProtActivationInfo			OPTIONAL,
		-- TABULAR: UL-TimingAdvance is applicable for TDD mode only.
		ul-TimingAdvance				UL-TimingAdvance					OPTIONAL,
	-- Radio bearer IEs
		count-C-ActivationTime			ActivationTime						OPTIONAL,
		rb-UL-CiphActivationTimeInfo	RB-ActivationTimeInfoList			OPTIONAL,
		ul-CounterSynchronisationInfo	UL-CounterSynchronisationInfo		OPTIONAL,
	-- Extension mechanism for non- release99 information
		nonCriticalExtensions			SEQUENCE {}		OPTIONAL
}

-- ***************************************************
--
-- TRANSPORT CHANNEL RECONFIGURATION FAILURE
--
-- ***************************************************

TransportChannelReconfigurationFailure ::= SEQUENCE {
	-- User equipment IEs
		rrc-TransactionIdentifier		RRC-TransactionIdentifier,
		failureCause					FailureCauseWithProtErr,
	-- Extension mechanism for non- release99 information
		nonCriticalExtensions			SEQUENCE {}		OPTIONAL
}

-- ***************************************************
--
-- TRANSPORT FORMAT COMBINATION CONTROL
--
-- ***************************************************

TransportFormatCombinationControl ::= SEQUENCE {
	-- TABULAR: Integrity protection shall not be performed on this message when transmitting this
message
	-- on the transparent mode signalling DCCH.
		rrc-TransactionIdentifier		RRC-TransactionIdentifier			OPTIONAL,
	-- The information element is not included when transmitting the message
	-- on the transparent mode signalling DCCH
```

```
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            tfcs-ID                             TFCS-Identity   OPTIONAL
            }
    },
    dpch-TFCS-InUplink                  TFC-Subset,
    activationTimeForTFCSubset          ActivationTime                      OPTIONAL,
    tfc-ControlDuration                 TFC-ControlDuration                 OPTIONAL,
    -- The information element is not included when transmitting the message
    -- on the transparent mode signalling DCCH and is optional otherwise
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- TRANSPORT FORMAT COMBINATION CONTROL FAILURE
--
-- ***************************************************

TransportFormatCombinationControlFailure ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- UE CAPABILITY ENQUIRY
--
-- ***************************************************

UECapabilityEnquiry ::= CHOICE {
    r3                              SEQUENCE {
        ueCapabilityEnquiry-r3          UECapabilityEnquiry-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            ueCapabilityEnquiry-r3-r4-ext   UECapabilityEnquiry-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }       OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

UECapabilityEnquiry-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        capabilityUpdateRequirement     CapabilityUpdateRequirement
}

UECapabilityEnquiry-r3-r4-ext-IEs ::= SEQUENCE {
        capabilityUpdateRequirement-r4-ext  CapabilityUpdateRequirement-r4-ext
}

-- ***************************************************
--
-- UE CAPABILITY INFORMATION
--
-- ***************************************************

UECapabilityInformation ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier           OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability            OPTIONAL,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList
    OPTIONAL,
        v370NonCriticalExtensions           SEQUENCE {
            ueCapabilityInformation-v370ext UECapabilityInformation-v370ext,
            v380NonCriticalExtensions           SEQUENCE {
                ueCapabilityInformation-v380ext     UECapabilityInformation-v380ext-IEs,
                -- Reserved for future non critical extension
                v4NonCriticalExtensions         SEQUENCE {
```

```
                    ueCapabilityInformation-r3-r4-ext
                                            UECapabilityInformation-r3-r4-ext,
                    nonCriticalExtensions-r4        SEQUENCE {}     OPTIONAL
                }       OPTIONAL
            }       OPTIONAL
        }       OPTIONAL
}

UECapabilityInformation-v370ext::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-v370ext        UE-RadioAccessCapability-v370ext        OPTIONAL
}

UECapabilityInformation-v380ext-IEs ::= SEQUENCE {
    -- User equipment IEs
    ue-RadioAccessCapability-v380ext        UE-RadioAccessCapability-v380ext            OPTIONAL,
    dl-PhysChCapabilityFDD-v380ext          DL-PhysChCapabilityFDD-v380ext
}

UECapabilityInformation-r3-r4-ext ::= SEQUENCE {
    -- User equipment IEs
        ue-RadioAccessCapability-r4-ext     UE-RadioAccessCapability-r4-ext     OPTIONAL
}

-- ***************************************************
--
-- UE CAPABILITY INFORMATION CONFIRM
--
-- ***************************************************

UECapabilityInformationConfirm ::= CHOICE {
    r3                              SEQUENCE {
        ueCapabilityInformationConfirm-r3
                                        UECapabilityInformationConfirm-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

UECapabilityInformationConfirm-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier
}

-- ***************************************************
--
-- UPLINK DIRECT TRANSFER
--
-- ***************************************************

UplinkDirectTransfer ::= SEQUENCE {
    -- Core network IEs
        cn-DomainIdentity               CN-DomainIdentity,
        nas-Message                     NAS-Message,
    -- Measurement IEs
        measuredResultsOnRACH           MeasuredResultsOnRACH               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- UPLINK PHYSICAL CHANNEL CONTROL
--
-- ***************************************************

UplinkPhysicalChannelControl ::= CHOICE {
    r3                              SEQUENCE {
        uplinkPhysicalChannelControl-r3 UplinkPhysicalChannelControl-r3-IEs,
        nonCriticalExtensions           SEQUENCE {
            -- In case of TDD, the following IE is included instead of the IE
            -- up-IPDL-Parameters in up-OTDOA-AssistanceData
            openLoopPowerControl-IPDL-TDD   OpenLoopPowerControl-IPDL-TDD-r4    OPTIONAL,
            -- Extension mechanism for non- release4 information
            noncriticalExtensions           SEQUENCE {}                     OPTIONAL
```

```
        }                                                                   OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              CHOICE {
            r4                              SEQUENCE {
                uplinkPhysicalChannelControl-r4 UplinkPhysicalChannelControl-r4-IEs,
                nonCriticalExtensions           SEQUENCE {} OPTIONAL
            },
            criticalExtensions              SEQUENCE {}
        }
    }
}

UplinkPhysicalChannelControl-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    -- Physical channel IEs
        ccTrCH-PowerControlInfo         CCTrCH-PowerControlInfo             OPTIONAL,
        timingAdvance                   UL-TimingAdvanceControl             OPTIONAL,
        alpha                           Alpha                               OPTIONAL,
        specialBurstScheduling          SpecialBurstScheduling              OPTIONAL,
        prach-ConstantValue             ConstantValue                       OPTIONAL,
        pusch-ConstantValue             ConstantValue                       OPTIONAL
}

UplinkPhysicalChannelControl-r4-IEs ::= SEQUENCE {
    -- Physical channel IEs
        ccTrCH-PowerControlInfo         CCTrCH-PowerControlInfo-r4          OPTIONAL,
        tddOption                       CHOICE {
            tdd384                          SEQUENCE {
                timingAdvance                   UL-TimingAdvanceControl-r4  OPTIONAL,
                alpha                           Alpha                       OPTIONAL,
                prach-ConstantValue             ConstantValue               OPTIONAL,
                pusch-ConstantValue             ConstantValue               OPTIONAL,
                openLoopPowerControl-IPDL-TDD   OpenLoopPowerControl-IPDL-TDD-r4    OPTIONAL
            },
            tdd128                          SEQUENCE {
                ul-SynchronisationParameters    UL-SynchronisationParameters-r4 OPTIONAL
            }
        }
}

-- ***************************************************
--
-- URA UPDATE
--
-- ***************************************************

URAUpdate ::= SEQUENCE {
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        ura-UpdateCause                 URA-UpdateCause,
        protocolErrorIndicator          ProtocolErrorIndicatorWithMoreInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- URA UPDATE CONFIRM
--
-- ***************************************************

URAUpdateConfirm ::= CHOICE {
    r3                              SEQUENCE {
        uraUpdateConfirm-r3             URAUpdateConfirm-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

URAUpdateConfirm-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
```

```
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        rrc-StateIndicator              RRC-StateIndicator,
        utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient    OPTIONAL,
    -- CN information elements
        cn-InformationInfo              CN-InformationInfo                  OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL
}

-- ***************************************************
--
-- URA UPDATE CONFIRM for CCCH
--
-- ***************************************************

URAUpdateConfirm-CCCH ::= CHOICE {
    r3                              SEQUENCE {
        uraUpdateConfirm-CCCH-r3        URAUpdateConfirm-CCCH-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        u-RNTI                          U-RNTI,
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

URAUpdateConfirm-CCCH-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        u-RNTI                          U-RNTI,
    -- The rest of the message is identical to the one sent on DCCH.
        uraUpdateConfirm                URAUpdateConfirm-r3-IEs
}

-- ***************************************************
--
-- UTRAN MOBILITY INFORMATION
--
-- ***************************************************

UTRANMobilityInformation ::= CHOICE {
    r3                              SEQUENCE {
        utranMobilityInformation-r3     UTRANMobilityInformation-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
    },
    later-than-r3                   SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        criticalExtensions              SEQUENCE {}
    }
}

UTRANMobilityInformation-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        integrityProtectionModeInfo     IntegrityProtectionModeInfo         OPTIONAL,
        cipheringModeInfo               CipheringModeInfo                   OPTIONAL,
        new-U-RNTI                      U-RNTI                              OPTIONAL,
        new-C-RNTI                      C-RNTI                              OPTIONAL,
        ue-ConnTimersAndConstants       UE-ConnTimersAndConstants           OPTIONAL,
    -- CN information elements
        cn-InformationInfo              CN-InformationInfoFull              OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Radio bearer IEs
        dl-CounterSynchronisationInfo   DL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- UTRAN MOBILITY INFORMATION CONFIRM
--
```

```
-- ***************************************************

UTRANMobilityInformationConfirm ::= SEQUENCE {
    -- User equipment IEs
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        ul-IntegProtActivationInfo      IntegrityProtActivationInfo         OPTIONAL,
    -- Radio bearer IEs
        count-C-ActivationTime          ActivationTime                      OPTIONAL,
        rb-UL-CiphActivationTimeInfo    RB-ActivationTimeInfoList           OPTIONAL,
        ul-CounterSynchronisationInfo   UL-CounterSynchronisationInfo       OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

-- ***************************************************
--
-- UTRAN MOBILITY INFORMATION FAILURE
--
-- ***************************************************

UTRANMobilityInformationFailure ::= SEQUENCE {
    -- UE information elements
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

END
```

11.3 Information element definitions

```
InformationElements DEFINITIONS AUTOMATIC TAGS ::=

-- ***************************************************
--
--      CORE NETWORK INFORMATION ELEMENTS (10.3.1)
--
-- ***************************************************

BEGIN

IMPORTS

    hiPDSCHidentities,
    hiPUSCHidentities,
    hiRM,
    maxAC,
    maxAdditionalMeas,
    maxASC,
    maxASCmap,
    maxASCpersist,
    maxCCTrCH,
    maxCellMeas,
    maxCellMeas-1,
    maxCNdomains,
    maxCPCHsets,
    maxDPCH-DLchan,
    maxDPDCH-UL,
    maxDRACclasses,
    maxFACHPCH,
    maxFreq,
    maxFreqBandsFDD,
    maxFreqBandsTDD,
    maxFreqBandsGSM,
    maxInterSysMessages,
    maxLoCHperRLC,
    maxMeasEvent,
    maxMeasIntervals,
    maxMeasParEvent,
    maxNumCDMA2000Freqs,
    maxNumFDDFreqs,
    maxNumGSMFreqRanges,
    maxNumTDDFreqs,
    maxOtherRAT,
    maxPage1,
    maxPCPCH-APsig,
    maxPCPCH-APsubCh,
```

```
    maxPCPCH-CDsig,
    maxPCPCH-CDsubCh,
    maxPCPCH-SF,
    maxPCPCHs,
    maxPDCPAlgoType,
    maxPDSCH,
    maxPDSCH-TFCIgroups,
    maxPRACH,
    maxPRACH-FPACH,
    maxPredefConfig,
    maxPUSCH,
    maxRABsetup,
    maxRAT,
    maxRB,
    maxRBallRABs,
    maxRBMuxOptions,
    maxRBperRAB,
    maxReportedGSMCells,
    maxSRBsetup,
    maxRL,
    maxRL-1,
    maxROHC-PacketSizes-r4,
    maxROHC-Profile-r4,
    maxSCCPCH,
    maxSat,
    maxSIB,
    maxSIB-FACH,
    maxSystemCapability,
    maxTF,
    maxTF-CPCH,
    maxTFC,
    maxTFCI-2-Combs,
    maxTGPS,
    maxTrCH,
    maxTrCHpreconf,
    maxTS,
    maxTS-1,
    maxTS-LCR,
    maxTS-LCR-1,
    maxURA
FROM Constant-definitions;

Ansi-41-IDNNS ::=                           BIT STRING (SIZE (14))

CN-DomainIdentity ::=               ENUMERATED {
                                        cs-domain,
                                        ps-domain }

CN-DomainInformation ::=            SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    cn-DomainSpecificNAS-Info           NAS-SystemInformationGSM-MAP
}

CN-DomainInformationFull ::=        SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    cn-DomainSpecificNAS-Info           NAS-SystemInformationGSM-MAP,
    cn-DRX-CycleLengthCoeff             CN-DRX-CycleLengthCoefficient
}

CN-DomainInformationList ::=        SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        CN-DomainInformation

CN-DomainInformationListFull ::=    SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        CN-DomainInformationFull

CN-DomainSysInfo ::=                SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    cn-Type                             CHOICE {
        gsm-MAP                             NAS-SystemInformationGSM-MAP,
        ansi-41                             NAS-SystemInformationANSI-41
    },
    cn-DRX-CycleLengthCoeff             CN-DRX-CycleLengthCoefficient
}

CN-DomainSysInfoList ::=            SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        CN-DomainSysInfo

CN-InformationInfo ::=              SEQUENCE {
    plmn-Identity                       PLMN-Identity                       OPTIONAL,
```

```
    cn-CommonGSM-MAP-NAS-SysInfo        NAS-SystemInformationGSM-MAP        OPTIONAL,
    cn-DomainInformationList            CN-DomainInformationList            OPTIONAL
}

CN-InformationInfoFull ::=          SEQUENCE {
    plmn-Identity                       PLMN-Identity                       OPTIONAL,
    cn-CommonGSM-MAP-NAS-SysInfo        NAS-SystemInformationGSM-MAP        OPTIONAL,
    cn-DomainInformationListFull        CN-DomainInformationListFull        OPTIONAL
}

Digit ::=                           INTEGER (0..9)

Gsm-map-IDNNS ::=                           SEQUENCE {
    routingbasis                                    CHOICE {
        localPTMSI                                      SEQUENCE {
            routingparameter                                RoutingParameter
        },
        tMSIofsamePLMN                                  SEQUENCE {
            routingparameter                                RoutingParameter
        },
        tMSIofdifferentPLMN                         SEQUENCE {
            routingparameter                                RoutingParameter
        },
        iMSIresponsetopaging                            SEQUENCE {
            routingparameter                                RoutingParameter
        },
        iMSIUEinitiatedEvent                            SEQUENCE {
            routingparameter                                RoutingParameter
        },
        iMEI                                            SEQUENCE {
            routingparameter                                RoutingParameter
        },
        spare1                                          SEQUENCE {
            routingparameter                                RoutingParameter
        },
        spare2                                          SEQUENCE {
            routingparameter                                RoutingParameter
        }
    },
    enteredparameter                                    BOOLEAN
}

IMEI ::=                            SEQUENCE (SIZE (15)) OF
                                        IMEI-Digit

IMEI-Digit ::=                      INTEGER (0..15)

IMSI-GSM-MAP ::=                    SEQUENCE (SIZE (6..15)) OF
                                        Digit

IntraDomainNasNodeSelector ::=              SEQUENCE {
    version                                     CHOICE {
        release99                                   SEQUENCE {
            cn-Type                                     CHOICE {
                gsm-Map-IDNNS                               Gsm-map-IDNNS,
                ansi-41-IDNNS                               Ansi-41-IDNNS
            }
        },
        later                                       SEQUENCE {
            futurecoding                                BIT STRING (SIZE (15))
        }
    }
}

LAI ::=                             SEQUENCE {
    plmn-Identity                       PLMN-Identity,
    lac                                 BIT STRING (SIZE (16))
}

MCC ::=                             SEQUENCE (SIZE (3)) OF
                                        Digit

MNC ::=                             SEQUENCE (SIZE (2..3)) OF
                                        Digit

NAS-Message ::=                     OCTET STRING (SIZE (1..4095))

NAS-Synchronisation-Indicator   ::=     BIT STRING(SIZE(4))
```

```
NAS-SystemInformationGSM-MAP ::=    OCTET STRING (SIZE (1..8))

P-TMSI-GSM-MAP ::=                  BIT STRING (SIZE (32))

PagingRecordTypeID ::=              ENUMERATED {
                                        imsi-GSM-MAP,
                                        tmsi-GSM-MAP-P-TMSI,
                                        imsi-DS-41,
                                        tmsi-DS-41 }

PLMN-Identity ::=                   SEQUENCE {
    mcc                                 MCC,
    mnc                                 MNC
}

PLMN-Type ::=                       CHOICE {
    gsm-MAP                             SEQUENCE {
        plmn-Identity                       PLMN-Identity
    },
    ansi-41                         SEQUENCE {
        p-REV                               P-REV,
        min-P-REV                           Min-P-REV,
        sid                                 SID,
        nid                                 NID
    },
    gsm-MAP-and-ANSI-41             SEQUENCE {
        plmn-Identity                       PLMN-Identity,
        p-REV                               P-REV,
        min-P-REV                           Min-P-REV,
        sid                                 SID,
        nid                                 NID
    }
}

RAB-Identity ::=                    CHOICE {
    gsm-MAP-RAB-Identity                BIT STRING (SIZE (8)),
    ansi-41-RAB-Identity                BIT STRING (SIZE (8))
}

RAI ::=                             SEQUENCE {
    lai                                 LAI,
    rac                                 RoutingAreaCode
}

RoutingAreaCode ::=                 BIT STRING (SIZE (8))

RoutingParameter ::=                            BIT STRING (SIZE (10))

TMSI-GSM-MAP ::=                    BIT STRING (SIZE (32))

-- ***************************************************
--
--      UTRAN MOBILITY INFORMATION ELEMENTS (10.3.2)
--
-- ***************************************************

AccessClassBarred ::=               ENUMERATED {
                                        barred, notBarred }

AccessClassBarredList ::=           SEQUENCE (SIZE (maxAC)) OF
                                        AccessClassBarred

AllowedIndicator ::=                ENUMERATED {
                                        allowed, notAllowed }

CellAccessRestriction ::=           SEQUENCE {
    cellBarred                          CellBarred,
    cellReservedForOperatorUse          ReservedIndicator,
    cellReservationExtension            ReservedIndicator,
    accessClassBarredList               AccessClassBarredList               OPTIONAL
}

CellBarred ::=                      CHOICE {
    barred                              SEQUENCE {
        intraFreqCellReselectionInd         AllowedIndicator,
        t-Barred                            T-Barred
    },
```

```
    notBarred                           NULL
}

CellIdentity ::=                    BIT STRING (SIZE (28))

CellSelectReselectInfoSIB-3-4 ::=   SEQUENCE {
    mappingInfo                         MappingInfo                         OPTIONAL,
    cellSelectQualityMeasure            CHOICE {
        cpich-Ec-N0                         SEQUENCE {
            q-HYST-2-S                          Q-Hyst-S                    OPTIONAL
            -- Default value for q-HYST-2-S is q-HYST-1-S
        },
        cpich-RSCP                          NULL
    },
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchQual                OPTIONAL,
            s-Intersearch                       S-SearchQual                OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-FDD-InfoList            OPTIONAL,
            q-QualMin                           Q-QualMin,
            q-RxlevMin                          Q-RxlevMin
        },
        tdd                                 SEQUENCE {
            s-Intrasearch                       S-SearchRXLEV               OPTIONAL,
            s-Intersearch                       S-SearchRXLEV               OPTIONAL,
            s-SearchHCS                         S-SearchRXLEV               OPTIONAL,
            rat-List                            RAT-TDD-InfoList            OPTIONAL,
            q-RxlevMin                          Q-RxlevMin
        }
    },
    q-Hyst-l-S                          Q-Hyst-S,
    t-Reselection-S                     T-Reselection-S,
    hcs-ServingCellInformation          HCS-ServingCellInformation          OPTIONAL,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power
}

MapParameter ::=                    INTEGER (0..99)

Mapping ::=                         SEQUENCE {
    rat                                 RAT,
    mappingFunctionParameterList        MappingFunctionParameterList
}

Mapping-LCR-r4 ::=                  SEQUENCE {
    mappingFunctionParameterList        MappingFunctionParameterList
}

MappingFunctionParameter ::=        SEQUENCE {
    functionType                        MappingFunctionType,
    mapParameter1                       MapParameter                        OPTIONAL,
    mapParameter2                       MapParameter,
    upperLimit                          UpperLimit                          OPTIONAL
    -- The parameter is conditional on the number of repetition
}

MappingFunctionParameterList ::=    SEQUENCE (SIZE (1..maxMeasIntervals)) OF
                                        MappingFunctionParameter

MappingFunctionType ::=             ENUMERATED {
                                        linear,
                                        functionType2,
                                        functionType3,
                                        functionType4 }

-- In this list, mapping for FDD and 3.84Mcps TDD is defined. For 1.28Mcps TDD, Mapping-LCR-r4
-- is used instead.
MappingInfo ::=                     SEQUENCE (SIZE (1..maxRAT)) OF
                                        Mapping

-- Actual value = IE value * 2
Q-Hyst-S ::=                        INTEGER (0..20)

RAT ::=                             ENUMERATED {
                                        utra-FDD,
                                        utra-TDD,
                                        gsm,
                                        cdma2000 }
```

```
RAT-FDD-Info ::=                    SEQUENCE {
    rat-Identifier                      RAT-Identifier,
    s-SearchRAT                         S-SearchQual,
    s-HCS-RAT                           S-SearchRXLEV                           OPTIONAL,
    s-Limit-SearchRAT                   S-SearchQual
}

RAT-FDD-InfoList ::=                SEQUENCE (SIZE (1..maxOtherRAT)) OF
                                        RAT-FDD-Info

RAT-Identifier ::=                  ENUMERATED {
                                        gsm, cdma2000 }

RAT-TDD-Info ::=                    SEQUENCE {
    rat-Identifier                      RAT-Identifier,
    s-SearchRAT                         S-SearchRXLEV,
    s-HCS-RAT                           S-SearchRXLEV                       OPTIONAL,
    s-Limit-SearchRAT                   S-SearchRXLEV
}

RAT-TDD-InfoList ::=                SEQUENCE (SIZE (1..maxOtherRAT)) OF
                                        RAT-TDD-Info

ReservedIndicator ::=               ENUMERATED {
                                        reserved,
                                        notReserved }

-- Actual value = IE value * 2
S-SearchQual ::=                        INTEGER (-16..10)

-- Actual value = (IE value * 2) + 1
S-SearchRXLEV ::=                       INTEGER (-53..45)

T-Barred ::=                        ENUMERATED {
                                        s10, s20, s40, s80,
                                        s160, s320, s640, s1280 }

T-Reselection-S ::=                 INTEGER (0..31)

-- The used range depends on the RAT used.
UpperLimit ::=                      INTEGER (1..91)

URA-Identity ::=                    BIT STRING (SIZE (16))

URA-IdentityList ::=                SEQUENCE (SIZE (1..maxURA)) OF
                                        URA-Identity

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

ActivationTime ::=                  INTEGER (0..255)
-- TABULAR : value 'now' always appear as default, and is encoded by absence of the field

BackoffControlParams ::=            SEQUENCE {
    n-AP-RetransMax                     N-AP-RetransMax,
    n-AccessFails                       N-AccessFails,
    nf-BO-NoAICH                        NF-BO-NoAICH,
    ns-BO-Busy                          NS-BO-Busy,
    nf-BO-AllBusy                       NF-BO-AllBusy,
    nf-BO-Mismatch                      NF-BO-Mismatch,
    t-CPCH                              T-CPCH
}

C-RNTI ::=                          BIT STRING (SIZE (16))

CapabilityUpdateRequirement ::=     SEQUENCE {
    ue-RadioCapabilityFDDUpdateRequirement-FDD  BOOLEAN,
-- The following is for 3.84Mcps TDD update requirement
    ue-RadioCapabilityTDDUpdateRequirement-TDD  BOOLEAN,
    systemSpecificCapUpdateReqList      SystemSpecificCapUpdateReqList      OPTIONAL
}

CapabilityUpdateRequirement-r4-ext ::= SEQUENCE {
    ue-RadioCapabilityUpdateRequirement-TDD128  BOOLEAN
```

```
}

CapabilityUpdateRequirement-r4 ::=  SEQUENCE {
    ue-RadioCapabilityFDDUpdateRequirement-FDD  BOOLEAN,
    ue-RadioCapabilityTDDUpdateRequirement-TDD384   BOOLEAN,
    ue-RadioCapabilityTDDUpdateRequirement-TDD128   BOOLEAN,
    systemSpecificCapUpdateReqList      SystemSpecificCapUpdateReqList      OPTIONAL
}

CellUpdateCause ::=                 ENUMERATED {
                                        cellReselection,
                                        periodicalCellUpdate,
                                        uplinkDataTransmission,
                                        utran-pagingResponse,
                                        re-enteredServiceArea,
                                        radiolinkFailure,
                                        rlc-unrecoverableError,
                                        spare1 }

ChipRateCapability ::=              ENUMERATED {
                                        mcps3-84, mcps1-28 }

CipheringAlgorithm ::=              ENUMERATED {
                                        uea0, uea1 }

CipheringModeCommand ::=            CHOICE {
    startRestart                        CipheringAlgorithm,
    stopCiphering                       NULL
}

CipheringModeInfo ::=               SEQUENCE {
    cipheringModeCommand                CipheringModeCommand,
    -- TABULAR: The ciphering algorithm is included in
    -- the CipheringModeCommand.
    activationTimeForDPCH               ActivationTime                      OPTIONAL,
    rb-DL-CiphActivationTimeInfo        RB-ActivationTimeInfoList           OPTIONAL
}

CN-DRX-CycleLengthCoefficient ::=   INTEGER (6..9)

CN-PagedUE-Identity ::=             CHOICE {
    imsi-GSM-MAP                        IMSI-GSM-MAP,
    tmsi-GSM-MAP                        TMSI-GSM-MAP,
    p-TMSI-GSM-MAP                      P-TMSI-GSM-MAP,
    imsi-DS-41                          IMSI-DS-41,
    tmsi-DS-41                          TMSI-DS-41
}

CompressedModeMeasCapability ::=    SEQUENCE {
    fdd-Measurements                    BOOLEAN,
    -- TABULAR: The IEs below are made optional since they are conditional based
    -- on another information element. Their absence corresponds to the case where
    -- the condition is not true.
    -- tdd-Measurements indicates need for compressed mode for 3.84Mcps TDD measurements
    tdd-Measurements                    BOOLEAN                             OPTIONAL,
    gsm-Measurements                    GSM-Measurements                    OPTIONAL,
    multiCarrierMeasurements            BOOLEAN                             OPTIONAL
}

CompressedModeMeasCapability-LCR-r4 ::= SEQUENCE {
    tdd128-Measurements                     BOOLEAN                         OPTIONAL
}

CompressedModeMeasCapabFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                        CompressedModeMeasCapabFDD

CompressedModeMeasCapabFDD ::=      SEQUENCE {
    radioFrequencyBandFDD               RadioFrequencyBandFDD   OPTIONAL,
    dl-MeasurementsFDD                  BOOLEAN,
    ul-MeasurementsFDD                  BOOLEAN
}

CompressedModeMeasCapabTDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsTDD)) OF
                                        CompressedModeMeasCapabTDD

CompressedModeMeasCapabTDD ::=      SEQUENCE {
    radioFrequencyBandTDD               RadioFrequencyBandTDD,
    dl-MeasurementsTDD                  BOOLEAN,
```

```
    ul-MeasurementsTDD                  BOOLEAN
}

CompressedModeMeasCapabGSMList ::=  SEQUENCE (SIZE (1..maxFreqBandsGSM)) OF
                                        CompressedModeMeasCapabGSM

CompressedModeMeasCapabGSM ::=      SEQUENCE {
    radioFrequencyBandGSM               RadioFrequencyBandGSM,
    dl-MeasurementsGSM                  BOOLEAN,
    ul-MeasurementsGSM                  BOOLEAN
}

CompressedModeMeasCapabMC ::=       SEQUENCE {
    dl-MeasurementsMC                   BOOLEAN,
    ul-MeasurementsMC                   BOOLEAN
}

CPCH-Parameters ::=                 SEQUENCE {
    initialPriorityDelayList            InitialPriorityDelayList            OPTIONAL,
    backoffControlParams                BackoffControlParams,
    powerControlAlgorithm               PowerControlAlgorithm,
    -- TABULAR: TPC step size nested inside PowerControlAlgorithm
    dl-DPCCH-BER                        DL-DPCCH-BER
}

DL-DPCCH-BER ::=                    INTEGER (0..63)

DL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPCH-PDSCH-Codes               INTEGER (1..8),
    maxNoPhysChBitsReceived             MaxNoPhysChBitsReceived,
    supportForSF-512                    BOOLEAN,
    supportOfPDSCH                      BOOLEAN,
    simultaneousSCCPCH-DPCH-Reception   SimultaneousSCCPCH-DPCH-Reception
}

DL-PhysChCapabilityFDD-v380ext ::=          SEQUENCE {
    supportOfDedicatedPilotsForChEstimation     SupportOfDedicatedPilotsForChEstimation     OPTIONAL
}

SupportOfDedicatedPilotsForChEstimation ::=         ENUMERATED { true }

DL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerFrame                   MaxPhysChPerFrame,
    minimumSF                           MinimumSF-DL,
    supportOfPDSCH                      BOOLEAN,
    maxPhysChPerTS                      MaxPhysChPerTS
}

DL-PhysChCapabilityTDD-LCR-r4 ::=   SEQUENCE {
    maxTS-PerSubFrame                   MaxTS-PerSubFrame-r4,
    maxPhysChPerFrame                   MaxPhysChPerSubFrame-r4,
    minimumSF                           MinimumSF-DL,
    supportOfPDSCH                      BOOLEAN,
    maxPhysChPerTS                      MaxPhysChPerTS,
    supportOf8PSK                       BOOLEAN
}

DL-TransChCapability ::=            SEQUENCE {
    maxNoBitsReceived                   MaxNoBits,
    maxConvCodeBitsReceived             MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsDL,
    maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count,
    maxReceivedTransportBlocks          MaxTransportBlocksDL,
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-DL,
    maxNumberOfTF                       MaxNumberOfTF
}

DRAC-SysInfo ::=                    SEQUENCE {
    transmissionProbability             TransmissionProbability,
    maximumBitRate                      MaximumBitRate
}

DRAC-SysInfoList ::=                SEQUENCE (SIZE (1..maxDRACclasses)) OF
                                        DRAC-SysInfo

ESN-DS-41 ::=                       BIT STRING (SIZE (32))
```

```
EstablishmentCause ::=              ENUMERATED {
                                        originatingConversationalCall,
                                        originatingStreamingCall,
                                        originatingInteractiveCall,
                                        originatingBackgroundCall,
                                        originatingSubscribedTrafficCall,
                                        terminatingConversationalCall,
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        emergencyCall,
                                        interRAT-CellReselection,
                                        interRAT-CellChangeOrder,
                                        registration,
                                        detach,
                                        originatingHighPrioritySignalling,
                                        originatingLowPrioritySignalling,
                                        callRe-establishment,
                                        terminatingHighPrioritySignalling,
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown,
                                        spare1 }

FailureCauseWithProtErr ::=         CHOICE {
    configurationUnsupported            NULL,
    physicalChannelFailure              NULL,
    incompatibleSimultaneousReconfiguration
                                        NULL,
    compressedModeRuntimeError          TGPSI,
    protocolError                       ProtocolErrorInformation,
    cellUpdateOccurred                  NULL,
    invalidConfiguration                NULL,
    configurationIncomplete             NULL,
    unsupportedMeasurement              NULL,
    spare1                              NULL,
    spare2                              NULL,
    spare3                              NULL,
    spare4                              NULL,
    spare5                              NULL,
    spare6                              NULL,
    spare7                              NULL
}

FailureCauseWithProtErrTrId ::=     SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        failureCause                    FailureCauseWithProtErr
}

GSM-Measurements ::=                SEQUENCE {
    gsm900                              BOOLEAN,
    dcs1800                             BOOLEAN,
    gsm1900                             BOOLEAN
}


-- If ICS-Version-r4 is included, the following IE shall be ignored.
ICS-Version ::=                     ENUMERATED {
                                        r99 }

ICS-Version-r4 ::=                  ENUMERATED {
                                        rel-4 }

IMSI-and-ESN-DS-41 ::=              SEQUENCE {
    imsi-DS-41                          IMSI-DS-41,
    esn-DS-41                           ESN-DS-41
}

IMSI-DS-41 ::=                      OCTET STRING (SIZE (5..7))

InitialPriorityDelayList ::=        SEQUENCE (SIZE (1..maxASC)) OF
                                        NS-IP

InitialUE-Identity ::=              CHOICE {
    imsi                                IMSI-GSM-MAP,
    tmsi-and-LAI                        TMSI-and-LAI-GSM-MAP,
    p-TMSI-and-RAI                      P-TMSI-and-RAI-GSM-MAP,
    imei                                IMEI,
```

```
	esn-DS-41							ESN-DS-41,
	imsi-DS-41							IMSI-DS-41,
	imsi-and-ESN-DS-41					IMSI-and-ESN-DS-41,
	tmsi-DS-41							TMSI-DS-41
}

IntegrityCheckInfo ::=				SEQUENCE {
	messageAuthenticationCode			MessageAuthenticationCode,
	rrc-MessageSequenceNumber			RRC-MessageSequenceNumber
}

IntegrityProtActivationInfo ::=		SEQUENCE {
	rrc-MessageSequenceNumberList		RRC-MessageSequenceNumberList
}

IntegrityProtectionAlgorithm ::=	ENUMERATED {
										uia1 }


IntegrityProtectionModeCommand ::=	CHOICE {
	startIntegrityProtection			SEQUENCE {
		integrityProtInitNumber				IntegrityProtInitNumber
	},
	modify								SEQUENCE {
		dl-IntegrityProtActivationInfo		IntegrityProtActivationInfo
	}
}

IntegrityProtectionModeInfo ::=		SEQUENCE {
	integrityProtectionModeCommand		IntegrityProtectionModeCommand,
	-- TABULAR: DL integrity protection activation info and Integrity
	-- protection intialisation number have been nested inside
	-- IntegrityProtectionModeCommand.
	integrityProtectionAlgorithm		IntegrityProtectionAlgorithm		OPTIONAL
}

IntegrityProtInitNumber ::=			BIT STRING (SIZE (32))

MaxHcContextSpace ::=					ENUMERATED  {
											by512, by1024, by2048, by4096,
											by8192 }


MaxROHC-ContextSessions-r4 ::=		ENUMERATED  {
											s2, s4, s8, s12, s16, s24, s32, s48,
											s64, s128, s256, s512, s1024, s16384 }

MaximumAM-EntityNumberRLC-Cap ::=	ENUMERATED {
										am3, am4, am5, am6,
										am8, am16, am30 }

-- Actual value = IE value * 16
MaximumBitRate ::=					INTEGER (0..32)

MaximumRLC-WindowSize ::=			ENUMERATED { mws2047, mws4095 }

MaxNoDPDCH-BitsTransmitted ::=		ENUMERATED {
										b600, b1200, b2400, b4800,
										b9600, b19200, b28800, b38400,
										b48000, b57600 }

MaxNoBits ::=						ENUMERATED {
										b640, b1280, b2560, b3840, b5120,
										b6400, b7680, b8960, b10240,
										b20480, b40960, b81920, b163840 }

MaxNoPhysChBitsReceived ::=			ENUMERATED {
										b600, b1200, b2400, b3600,
										b4800, b7200, b9600, b14400,
										b19200, b28800, b38400, b48000,
										b57600, b67200, b76800 }

MaxNoSCCPCH-RL ::=					ENUMERATED {
										rl1 }

MaxNumberOfTF ::=					ENUMERATED {
										tf32, tf64, tf128, tf256,
										tf512, tf1024 }
```

```
MaxNumberOfTFC-InTFCS-DL ::=        ENUMERATED {
                                        tfc16, tfc32, tfc48, tfc64, tfc96,
                                        tfc128, tfc256, tfc512, tfc1024 }

MaxNumberOfTFC-InTFCS-UL ::=        ENUMERATED {
                                        tfc4, tfc8, tfc16, tfc32, tfc48, tfc64,
                                        tfc96, tfc128, tfc256, tfc512, tfc1024 }

MaxPhysChPerFrame ::=               INTEGER (1..224)

MaxPhysChPerSubFrame-r4 ::=         INTEGER (1..96)

MaxPhysChPerTimeslot ::=            ENUMERATED {
                                        ts1, ts2 }

MaxPhysChPerTS ::=                  INTEGER (1..16)

MaxSimultaneousCCTrCH-Count ::=     INTEGER (1..8)

MaxSimultaneousTransChsDL ::=       ENUMERATED {
                                        e4, e8, e16, e32 }

MaxSimultaneousTransChsUL ::=       ENUMERATED {
                                        e2, e4, e8, e16, e32 }

MaxTransportBlocksDL ::=            ENUMERATED {
                                        tb4, tb8, tb16, tb32, tb48,
                                        tb64, tb96, tb128, tb256, tb512 }

MaxTransportBlocksUL ::=            ENUMERATED {
                                        tb2, tb4, tb8, tb16, tb32, tb48,
                                        tb64, tb96, tb128, tb256, tb512 }

MaxTS-PerFrame ::=                  INTEGER (1..14)

MaxTS-PerSubFrame-r4 ::=            INTEGER (1..6)

-- TABULAR: This IE contains dependencies to UE-MultiModeRAT-Capability,
-- the conditional fields have been left mandatory for now.
MeasurementCapability ::=           SEQUENCE {
    downlinkCompressedMode              CompressedModeMeasCapability,
    uplinkCompressedMode                CompressedModeMeasCapability
}

MeasurementCapability-v370 ::=      SEQUENCE{
    compressedModeMeasCapabFDDList      CompressedModeMeasCapabFDDList,
    compressedModeMeasCapabTDDList      CompressedModeMeasCapabTDDList  OPTIONAL,
    compressedModeMeasCapabGSMList      CompressedModeMeasCapabGSMList  OPTIONAL,
    compressedModeMeasCapabMC           CompressedModeMeasCapabMC       OPTIONAL
}

MeasurementCapability-r4-ext ::=    SEQUENCE {
    downlinkCompressedMode-LCR          CompressedModeMeasCapability-LCR-r4,
    uplinkCompressedMode-LCR            CompressedModeMeasCapability-LCR-r4
}

MessageAuthenticationCode ::=       BIT STRING (SIZE (32))

MinimumSF-DL ::=                    ENUMERATED {
                                        sf1, sf16 }

MinimumSF-UL ::=                    ENUMERATED {
                                        sf1, sf2, sf4, sf8, sf16 }

MultiModeCapability ::=             ENUMERATED {
                                        tdd, fdd, fdd-tdd }

MultiRAT-Capability ::=             SEQUENCE {
    supportOfGSM                        BOOLEAN,
    supportOfMulticarrier               BOOLEAN
}

N-300 ::=                           INTEGER (0..7)

N-301 ::=                           INTEGER (0..7)

N-302 ::=                           INTEGER (0..7)
```

```
N-304 ::=                           INTEGER (0..7)

N-308 ::=                           INTEGER (1..8)

N-310 ::=                           INTEGER (0..7)

N-312 ::=                           ENUMERATED {
                                        s1, s50, s100, s200, s400,
                                        s600, s800, s1000 }

N-313 ::=                           ENUMERATED {
                                        s1, s2, s4, s10, s20,
                                         s50, s100, s200 }

N-315 ::=                           ENUMERATED {
                                        s1, s50, s100, s200, s400,
                                        s600, s800, s1000 }

N-AccessFails ::=                   INTEGER (1..64)

N-AP-RetransMax ::=                 INTEGER (1..64)

NetworkAssistedGPS-Supported ::=    ENUMERATED {
                                        networkBased,
                                        ue-Based,
                                        bothNetworkAndUE-Based,
                                        noNetworkAssistedGPS }

NF-BO-AllBusy ::=                   INTEGER (0..31)

NF-BO-NoAICH ::=                    INTEGER (0..31)

NF-BO-Mismatch ::=                  INTEGER (0..127)

NS-BO-Busy ::=                      INTEGER (0..63)

NS-IP ::=                           INTEGER (0..28)

P-TMSI-and-RAI-GSM-MAP ::=          SEQUENCE {
    p-TMSI                              P-TMSI-GSM-MAP,
    rai                                 RAI
}

PagingCause ::=                     ENUMERATED {
                                        terminatingConversationalCall,
                                        terminatingStreamingCall,
                                        terminatingInteractiveCall,
                                        terminatingBackgroundCall,
                                        terminatingHighPrioritySignalling,
                                        terminatingLowPrioritySignalling,
                                        terminatingCauseUnknown
 }

PagingRecord ::=                    CHOICE {
    cn-Identity                         SEQUENCE {
        pagingCause                         PagingCause,
        cn-DomainIdentity                   CN-DomainIdentity,
        cn-pagedUE-Identity                 CN-PagedUE-Identity
    },
    utran-Identity                      SEQUENCE {
        u-RNTI                              U-RNTI,
        cn-OriginatedPage-connectedMode-UE  SEQUENCE {
            pagingCause                         PagingCause,
            cn-DomainIdentity                   CN-DomainIdentity,
            pagingRecordTypeID                  PagingRecordTypeID
        }                                                                   OPTIONAL
    }
}

PagingRecordList ::=                SEQUENCE (SIZE (1..maxPage1)) OF
                                        PagingRecord

PDCP-Capability ::=                 SEQUENCE {
    losslessSRNS-RelocationSupport      BOOLEAN,
    supportForRfc2507                   CHOICE {
        notSupported                        NULL,
        supported                           MaxHcContextSpace
```

```
    }
}

PDCP-Capability-r4-ext ::=          SEQUENCE {
    supportForRfc3095               CHOICE {
        notSupported                        NULL,
        supported                           SEQUENCE {
            maxROHC-ContextSessions             MaxROHC-ContextSessions-r4  DEFAULT s16,
            reverseCompressionDepth             INTEGER (0..65535)          DEFAULT 0
        }
    }
}

PhysicalChannelCapability ::=       SEQUENCE {
        fddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityFDD,
            uplinkPhysChCapability              UL-PhysChCapabilityFDD
        }                                           OPTIONAL,
-- The following describes the 3.84Mcps TDD physical channel capability
        tddPhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityTDD,
            uplinkPhysChCapability              UL-PhysChCapabilityTDD
        }                                           OPTIONAL
}

-- The following describes the 1.28Mcps TDD physical channel capability
PhysicalChannelCapability-LCR-r4 ::=        SEQUENCE {
        tdd128-PhysChCapability                 SEQUENCE {
            downlinkPhysChCapability            DL-PhysChCapabilityTDD-LCR-r4,
            uplinkPhysChCapability              UL-PhysChCapabilityTDD-LCR-r4
        }                                           OPTIONAL
}

PNBSCH-Allocation-r4 ::=                SEQUENCE {
        numberOfRepetitionsPerSFNPeriod ENUMERATED {
                                            c2, c3, c4, c5, c6, c7, c8, c9, c10,
                                            c12, c14, c16, c18, c20, c24, c28, c32,
                                            c36, c40, c48, c56, c64, c72, c80  }
}

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

ProtocolErrorIndicator ::=          ENUMERATED {
                                        noError, errorOccurred }

ProtocolErrorIndicatorWithMoreInfo ::=
                                    CHOICE {
    noError                             NULL,
    errorOccurred                       SEQUENCE {
        rrc-TransactionIdentifier           RRC-TransactionIdentifier,
        protocolErrorInformation            ProtocolErrorInformation
    }
}

ProtocolErrorMoreInformation ::=    SEQUENCE {
    diagnosticsType                     CHOICE {
        type1                               CHOICE {
            asn1-ViolationOrEncodingError       NULL,
            messageTypeNonexistent              NULL,
            messageNotCompatibleWithReceiverState
                                                IdentificationOfReceivedMessage,
            ie-ValueNotComprehended             IdentificationOfReceivedMessage,
            conditionalInformationElementError  IdentificationOfReceivedMessage,
            messageExtensionNotComprehended     IdentificationOfReceivedMessage,
            spare1                              NULL,
            spare2                              NULL
        },
        spare                               NULL
    }
}
```

```
RadioFrequencyBandFDD ::=           ENUMERATED {
                                        fdd2100,
                                        fdd1900,
                                        spare1, spare2, spare3, spare4, spare5, spare6}

RadioFrequencyBandTDDList ::=       ENUMERATED {
                                        a, b, c, ab, ac, bc, abc }

RadioFrequencyBandTDD ::=           ENUMERATED {a, b, c, spare}

RadioFrequencyBandGSM ::=           ENUMERATED {
                                        gsm450,
                                        gsm480,
                                        gsm850,
                                        gsm900P,
                                        gsm900E,
                                        gsm1800,
                                        gsm1900,
                                        spare1, spare2, spare3, spare4, spare5,
                                        spare6, spare7, spare8, spare9}

Rb-timer-indicator ::=              SEQUENCE {
    t314-expired                        BOOLEAN,
    t315-expired                        BOOLEAN }

Re-EstablishmentTimer ::=           ENUMERATED {
                                        useT314, useT315
}

RedirectionInfo ::=                 CHOICE {
    frequencyInfo                       FrequencyInfo,
    interRATInfo                        InterRATInfo
}

RejectionCause ::=                  ENUMERATED {
                                        congestion,
                                        unspecified }

ReleaseCause ::=                    ENUMERATED {
                                        normalEvent,
                                        unspecified,
                                        pre-emptiveRelease,
                                        congestion,
                                        re-establishmentReject,
                                        directedsignallingconnectionre-establishment,
                                        userInactivity }

RF-Capability ::=                   SEQUENCE {
        fddRF-Capability                SEQUENCE {
            ue-PowerClass                   UE-PowerClass,
            txRxFrequencySeparation         TxRxFrequencySeparation
        }                                   OPTIONAL,
        tddRF-Capability                            SEQUENCE {
            ue-PowerClass               UE-PowerClass,
            radioFrequencyBandTDDList   RadioFrequencyBandTDDList,
            chipRateCapability          ChipRateCapability
        }                                   OPTIONAL

}

RF-Capability-r4-ext ::=                SEQUENCE {
        tddRF-Capability                            SEQUENCE {
            ue-PowerClass               UE-PowerClass,
            radioFrequencyBandTDDList   RadioFrequencyBandTDDList,
            chipRateCapability          ChipRateCapability
        }                                   OPTIONAL
}

RLC-Capability ::=                  SEQUENCE {
    totalRLC-AM-BufferSize              TotalRLC-AM-BufferSize,
    maximumRLC-WindowSize               MaximumRLC-WindowSize,
    maximumAM-EntityNumber              MaximumAM-EntityNumberRLC-Cap
}

RRC-MessageSequenceNumber ::=       INTEGER (0..15)


RRC-MessageSequenceNumberList ::=   SEQUENCE (SIZE (4..5)) OF
```

```
                                        RRC-MessageSequenceNumber

RRC-StateIndicator ::=              ENUMERATED {
                                        cell-DCH, cell-FACH, cell-PCH, ura-PCH }

RRC-TransactionIdentifier ::=       INTEGER (0..3)

S-RNTI ::=                          BIT STRING (SIZE (20))

S-RNTI-2 ::=                        BIT STRING (SIZE (10))

SecurityCapability ::=              SEQUENCE {
    cipheringAlgorithmCap               BIT STRING {
                                            spare15(0),
                                            spare14(1),
                                            spare13(2),
                                            spare12(3),
                                            spare11(4),
                                            spare10(5),
                                            spare9(6),
                                            spare8(7),
                                            spare7(8),
                                            spare6(9),
                                            spare5(10),
                                            spare4(11),
                                            spare3(12),
                                            spare2(13),
                                            uea1(14),
                                            uea0(15)
                                            }    (SIZE (16)),
    integrityProtectionAlgorithmCap     BIT STRING {
                                            spare15(0),
                                            spare14(1),
                                            spare13(2),
                                            spare12(3),
                                            spare11(4),
                                            spare10(5),
                                            spare9(6),
                                            spare8(7),
                                            spare7(8),
                                            spare6(9),
                                            spare5(10),
                                            spare4(11),
                                            spare3(12),
                                            spare2(13),
                                            uia1(14),
                                            spare0(15)
                                            }    (SIZE (16))
}

SimultaneousSCCPCH-DPCH-Reception ::= CHOICE {
    notSupported                        NULL,
    supported                           SEQUENCE {
        maxNoSCCPCH-RL                      MaxNoSCCPCH-RL,
        simultaneousSCCPCH-DPCH-DPDCH-Reception
                                            BOOLEAN
        -- The IE above is applicable only if IE Support of PDSCH = TRUE
    }
}

SRNC-Identity ::=                   BIT STRING (SIZE (12))


START-Value ::=                     BIT STRING (SIZE (20))

STARTList ::=                       SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        STARTSingle

STARTSingle ::=                     SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    start-Value                         START-Value
}

SystemSpecificCapUpdateReq ::=      ENUMERATED {
                                        gsm }

SystemSpecificCapUpdateReqList ::= SEQUENCE (SIZE (1..maxSystemCapability)) OF
                                        SystemSpecificCapUpdateReq
```

```
T-300 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-301 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-302 ::=                           ENUMERATED {
                                        ms100, ms200, ms400, ms600, ms800,
                                        ms1000, ms1200, ms1400, ms1600,
                                        ms1800, ms2000, ms3000, ms4000,
                                        ms6000, ms8000 }

T-304 ::=                           ENUMERATED {
                                        ms100, ms200, ms400,
                                        ms1000, ms2000, spare1, spare2, spare3 }

T-305 ::=                           ENUMERATED {
                                        noUpdate, m5, m10, m30,
                                        m60, m120, m360, m720 }

T-307 ::=                           ENUMERATED {
                                        s5, s10, s15, s20,
                                        s30, s40, s50 }

T-308 ::=                           ENUMERATED {
                                        ms40, ms80, ms160, ms320 }

T-309 ::=                           INTEGER (1..8)

T-310 ::=                           ENUMERATED {
                                        ms40, ms80, ms120, ms160,
                                        ms200, ms240, ms280, ms320 }

T-311 ::=                           ENUMERATED {
                                        ms250, ms500, ms750, ms1000,
                                        ms1250, ms1500, ms1750, ms2000 }

T-312 ::=                           INTEGER (0..15)
-- The value 0 for T-312 is not used in this version of the specification

T-313 ::=                           INTEGER (0..15)

T-314 ::=                           ENUMERATED {
                                        s0, s2, s4, s6, s8,
                                        s12, s16, s20 }

T-315 ::=                           ENUMERATED {
                                        s0, s10, s30, s60, s180,
                                        s600, s1200, s1800 }

T-316 ::=                           ENUMERATED {
                                        s0, s10, s20, s30, s40,
                                        s50, s-inf }

T-317 ::=                           ENUMERATED {
                                        s0, s10, s30, s60, s180,
                                        s600, s1200, s1800 }

T-CPCH ::=                          ENUMERATED {
                                        ct0, ct1 }

TMSI-and-LAI-GSM-MAP ::=            SEQUENCE {
    tmsi                                TMSI-GSM-MAP,
    lai                                 LAI
}

TMSI-DS-41 ::=                      OCTET STRING (SIZE (2..12))

TotalRLC-AM-BufferSize ::=          ENUMERATED {
                                        kb2, kb10, kb50, kb100,
```

```
                                        kb150, kb500, kb1000 }

-- Actual value = IE value * 0.125
TransmissionProbability ::=         INTEGER (1..8)

TransportChannelCapability ::=      SEQUENCE {
    dl-TransChCapability                DL-TransChCapability,
    ul-TransChCapability                UL-TransChCapability
}

TurboSupport ::=                    CHOICE {
    notSupported                        NULL,
    supported                           MaxNoBits
}

TxRxFrequencySeparation ::=         ENUMERATED {
                                        mhz190, mhz174-8-205-2,
                                        mhz134-8-245-2 }

U-RNTI ::=                          SEQUENCE {
    srnc-Identity                       SRNC-Identity,
    s-RNTI                              S-RNTI
}

U-RNTI-Short ::=                    SEQUENCE {
    srnc-Identity                       SRNC-Identity,
    s-RNTI-2                            S-RNTI-2
}

UE-ConnTimersAndConstants ::=       SEQUENCE {
-- Optional is used also for parameters for which the default value is the last one read in SIB1
-- t-301 and n-301 should not be used by the UE in this release of the protocol
    t-301                               T-301                               DEFAULT ms2000,
    n-301                               N-301                               DEFAULT 2,
    t-302                               T-302                               DEFAULT ms4000,
    n-302                               N-302                               DEFAULT 3,
    t-304                               T-304                               DEFAULT ms2000,
    n-304                               N-304                               DEFAULT 2,
    t-305                               T-305                               DEFAULT m30,
    t-307                               T-307                               DEFAULT s30,
    t-308                               T-308                               DEFAULT ms160,
    t-309                               T-309                               DEFAULT 5,
    t-310                               T-310                               DEFAULT ms160,
    n-310                               N-310                               DEFAULT 4,
    t-311                               T-311                               DEFAULT ms2000,
    t-312                               T-312                               DEFAULT 1,
    n-312                               N-312                               DEFAULT s1,
    t-313                               T-313                               DEFAULT 3,
    n-313                               N-313                               DEFAULT s20,
    t-314                               T-314                               DEFAULT s12,
    t-315                               T-315                               DEFAULT s180,
    n-315                               N-315                               DEFAULT s1,
    t-316                               T-316                               DEFAULT s30,
    t-317                               T-317                               DEFAULT s180
}

UE-IdleTimersAndConstants ::=       SEQUENCE {
    t-300                               T-300,
    n-300                               N-300,
    t-312                               T-312,
    n-312                               N-312
}

UE-MultiModeRAT-Capability ::=      SEQUENCE {
    multiRAT-CapabilityList             MultiRAT-Capability,
    multiModeCapability                 MultiModeCapability
}

UE-PowerClass ::=                   INTEGER (1..4)

UE-PowerClass-v370 ::=              ENUMERATED {class1, class2, class3, class4,
                                         spare1, spare2, spare3, spare4}

UE-RadioAccessCapability ::=        SEQUENCE {
    ics-Version                         ICS-Version,
    pdcp-Capability                     PDCP-Capability,
    rlc-Capability                      RLC-Capability,
    transportChannelCapability          TransportChannelCapability,
```

```
    rf-Capability                       RF-Capability,
    physicalChannelCapability           PhysicalChannelCapability,
    ue-MultiModeRAT-Capability          UE-MultiModeRAT-Capability,
    securityCapability                  SecurityCapability,
    ue-positioning-Capability                       UE-Positioning-Capability,
    measurementCapability               MeasurementCapability       OPTIONAL
}

UE-RadioAccessCapabilityInfo::=     SEQUENCE {
    ue-RadioAccessCapability            UE-RadioAccessCapability,
    ue-RadioAccessCapability-v370ext    UE-RadioAccessCapability-v370ext
}

UE-RadioAccessCapability-v370ext ::=    SEQUENCE {
    ue-RadioAccessCapabBandFDDList      UE-RadioAccessCapabBandFDDList
}

UE-RadioAccessCapability-v380ext ::=    SEQUENCE {
    ue-PositioningCapabilityExt         UE-PositioningCapabilityExt
}


UE-PositioningCapabilityExt ::=         SEQUENCE {
    rx-tx-TimeDifferenceType2Capable    BOOLEAN
}

UE-RadioAccessCapabBandFDDList ::=  SEQUENCE (SIZE (1..maxFreqBandsFDD)) OF
                                            UE-RadioAccessCapabBandFDD

UE-RadioAccessCapabBandFDD ::=  SEQUENCE{
    radioFrequencyBandFDD               RadioFrequencyBandFDD,
    fddRF-Capability                    SEQUENCE {
        ue-PowerClass                       UE-PowerClass-v370,
        txRxFrequencySeparation             TxRxFrequencySeparation
    }                                                           OPTIONAL,
    measurementCapability               MeasurementCapability-v370
}

UE-RadioAccessCapability-r4-ext ::= SEQUENCE {
    pdcp-Capability-r4-ext              PDCP-Capability-r4-ext,
    ics-Version-r4                      ICS-Version-r4,
    rf-Capability                       RF-Capability-r4-ext,
    physicalChannelCapability-LCR       PhysicalChannelCapability-LCR-r4,
    measurementCapability-r4-ext        MeasurementCapability-r4-ext    OPTIONAL
}

UL-PhysChCapabilityFDD ::=          SEQUENCE {
    maxNoDPDCH-BitsTransmitted          MaxNoDPDCH-BitsTransmitted,
    supportOfPCPCH                      BOOLEAN
}

UL-PhysChCapabilityTDD ::=          SEQUENCE {
    maxTS-PerFrame                      MaxTS-PerFrame,
    maxPhysChPerTimeslot                MaxPhysChPerTimeslot,
    minimumSF                           MinimumSF-UL,
    supportOfPUSCH                      BOOLEAN
}

UL-PhysChCapabilityTDD-LCR-r4 ::=   SEQUENCE {
    maxTS-PerSubFrame                   MaxTS-PerSubFrame-r4,
    maxPhysChPerTimeslot                MaxPhysChPerTimeslot,
    minimumSF                           MinimumSF-UL,
    supportOfPUSCH                      BOOLEAN,
    supportOf8PSK                       BOOLEAN
}

UL-TransChCapability ::=            SEQUENCE {
    maxNoBitsTransmitted                MaxNoBits,
    maxConvCodeBitsTransmitted          MaxNoBits,
    turboDecodingSupport                TurboSupport,
    maxSimultaneousTransChs             MaxSimultaneousTransChsUL,
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            maxSimultaneousCCTrCH-Count         MaxSimultaneousCCTrCH-Count
        }
    },
    maxTransmittedBlocks                MaxTransportBlocksUL,
```

```
    maxNumberOfTFC-InTFCS               MaxNumberOfTFC-InTFCS-UL,
    maxNumberOfTF                       MaxNumberOfTF
}

UE-Positioning-Capability ::=       SEQUENCE {
    standaloneLocMethodsSupported           BOOLEAN,
    ue-BasedOTDOA-Supported                 BOOLEAN,
    networkAssistedGPS-Supported            NetworkAssistedGPS-Supported,
    supportForUE-GPS-TimingOfCellFrames     BOOLEAN,
    supportForIPDL                          BOOLEAN
}

UE-SecurityInformation ::=          SEQUENCE {
    start-CS                            START-Value
}

URA-UpdateCause ::=                 ENUMERATED {
                                        changeOfURA,
                                        periodicURAUpdate,
                                        dummy,
                                        spare1 }

UTRAN-DRX-CycleLengthCoefficient ::= INTEGER (3..9)

WaitTime ::=                        INTEGER (0..15)

-- ***************************************************
--
--      RADIO BEARER INFORMATION ELEMENTS (10.3.4)
--
-- ***************************************************

AlgorithmSpecificInfo ::=           CHOICE {
    rfc2507-Info                        RFC2507-Info
}

AlgorithmSpecificInfo-r4 ::=        CHOICE {
    rfc2507-Info                        RFC2507-Info,
    rfc3095-Info                        RFC3095-Info-r4
}

CID-InclusionInfo-r4 ::=            ENUMERATED {
                                        pdcp-Header,
                                        rfc3095-PacketFormat }

-- Upper limit is 2^32 - 1
COUNT-C ::=                         INTEGER (0..4294967295)

-- Upper limit is 2^25 - 1
COUNT-C-MSB ::=                     INTEGER (0..33554431)

DefaultConfigIdentity ::=           INTEGER (0..9)

DefaultConfigMode ::=               ENUMERATED {
                                        fdd,
                                        tdd }

DL-AM-RLC-Mode ::=                  SEQUENCE {
    inSequenceDelivery                  BOOLEAN,
    receivingWindowSize                 ReceivingWindowSize,
    dl-RLC-StatusInfo                   DL-RLC-StatusInfo
}

DL-CounterSynchronisationInfo ::=       SEQUENCE {
    rB-WithPDCP-InfoList                    RB-WithPDCP-InfoList    OPTIONAL
}

DL-LogicalChannelMapping ::=        SEQUENCE {
    -- TABULAR: DL-TransportChannelType contains TransportChannelIdentity as well.
    dl-TransportChannelType             DL-TransportChannelType,
    logicalChannelIdentity              LogicalChannelIdentity              OPTIONAL
}

DL-LogicalChannelMappingList ::=    SEQUENCE (SIZE (1..maxLoCHperRLC)) OF
                                        DL-LogicalChannelMapping

DL-RLC-Mode ::=                     CHOICE {
    dl-AM-RLC-Mode                      DL-AM-RLC-Mode,
```

```
    dl-UM-RLC-Mode                      NULL,
    dl-TM-RLC-Mode                      DL-TM-RLC-Mode
}

DL-RLC-StatusInfo ::=               SEQUENCE {
    timerStatusProhibit                 TimerStatusProhibit                 OPTIONAL,
    timerEPC                            TimerEPC                            OPTIONAL,
    missingPDU-Indicator                    BOOLEAN,
    timerStatusPeriodic                 TimerStatusPeriodic                 OPTIONAL
}

DL-TM-RLC-Mode ::=                  SEQUENCE {
    segmentationIndication                  BOOLEAN
}

DL-TransportChannelType ::=         CHOICE {
    dch                                 TransportChannelIdentity,
    fach                                NULL,
    dsch                                TransportChannelIdentity,
    dch-and-dsch                        TransportChannelIdentityDCHandDSCH
}

ExpectReordering ::=                ENUMERATED {
                                        reorderingNotExpected,
                                        reorderingExpected }

ExplicitDiscard ::=                 SEQUENCE {
    timerMRW                            TimerMRW,
    timerDiscard                        TimerDiscard,
    maxMRW                              MaxMRW
}

HeaderCompressionInfo ::=           SEQUENCE {
    algorithmSpecificInfo               AlgorithmSpecificInfo
}

HeaderCompressionInfoList ::=       SEQUENCE (SIZE (1..maxPDCPAlgoType)) OF
                                        HeaderCompressionInfo

HeaderCompressionInfo-r4 ::=        SEQUENCE {
    algorithmSpecificInfo               AlgorithmSpecificInfo-r4
}

HeaderCompressionInfoList-r4 ::=    SEQUENCE (SIZE (1..maxPDCPAlgoType)) OF
                                        HeaderCompressionInfo-r4

LogicalChannelIdentity ::=          INTEGER (1..15)

LosslessSRNS-RelocSupport ::=       CHOICE {
    supported                           MaxPDCP-SN-WindowSize,
    notSupported                        NULL
}

MAC-LogicalChannelPriority ::=      INTEGER (1..8)

MaxDAT ::=                          ENUMERATED {
                                        dat1, dat2, dat3, dat4, dat5, dat6,
                                        dat7, dat8, dat9, dat10, dat15, dat20,
                                        dat25, dat30, dat35, dat40 }

MaxDAT-Retransmissions ::=          SEQUENCE {
    maxDAT                              MaxDAT,
    timerMRW                            TimerMRW,
    maxMRW                              MaxMRW
}

MaxMRW ::=                          ENUMERATED {
                                        mm1, mm4, mm6, mm8, mm12, mm16,
                                        mm24, mm32 }

MaxPDCP-SN-WindowSize ::=           ENUMERATED {
                                        sn255, sn65535 }

MaxRST ::=                          ENUMERATED {
                                        rst1, rst4, rst6, rst8, rst12,
                                        rst16, rst24, rst32 }

NoExplicitDiscard ::=               ENUMERATED {
```

```
                                        dt10, dt20, dt30, dt40, dt50,
                                        dt60, dt70, dt80, dt90, dt100 }

PDCP-Info ::=                       SEQUENCE {
    losslessSRNS-RelocSupport           LosslessSRNS-RelocSupport           OPTIONAL,
    pdcp-PDU-Header                     PDCP-PDU-Header,
    -- TABULAR: The IE above is MD in the tabular format and it can be encoded
    -- in one bit, so the OPTIONAL is removed for compactness.
    headerCompressionInfoList           HeaderCompressionInfoList           OPTIONAL
}

PDCP-Info-r4 ::=                    SEQUENCE {
    losslessSRNS-RelocSupport           LosslessSRNS-RelocSupport           OPTIONAL,
    pdcp-PDU-Header                     PDCP-PDU-Header,
    -- TABULAR: The IE above is MD in the tabular format and it can be encoded
    -- in one bit, so the OPTIONAL is removed for compactness.
    headerCompressionInfoList           HeaderCompressionInfoList-r4        OPTIONAL
}

PDCP-InfoReconfig ::=               SEQUENCE {
    pdcp-Info                           PDCP-Info,
-- dummy is not used in this version of the protocol
    dummy                               INTEGER (0..65535)
}

PDCP-InfoReconfig-r4 ::=            SEQUENCE {
    pdcp-Info                           PDCP-Info-r4,
    pdcp-SN-Info                        PDCP-SN-Info
}

PDCP-PDU-Header ::=                 ENUMERATED {
                                        present, absent }

PDCP-SN-Info ::=                    INTEGER (0..65535)

Poll-PDU ::=                        ENUMERATED {
                                        pdu1, pdu2, pdu4, pdu8, pdu16,
                                        pdu32, pdu64, pdu128 }

Poll-SDU ::=                        ENUMERATED {
                                        sdu1, sdu4, sdu16, sdu64 }

PollingInfo ::=                     SEQUENCE {
    timerPollProhibit                   TimerPollProhibit                   OPTIONAL,
    timerPoll                           TimerPoll                           OPTIONAL,
    poll-PDU                            Poll-PDU                            OPTIONAL,
    poll-SDU                            Poll-SDU                            OPTIONAL,
    lastTransmissionPDU-Poll            BOOLEAN,
    lastRetransmissionPDU-Poll          BOOLEAN,
    pollWindow                          PollWindow                          OPTIONAL,
    timerPollPeriodic                   TimerPollPeriodic                   OPTIONAL
}

PollWindow ::=                      ENUMERATED {
                                        pw50, pw60, pw70, pw80, pw85,
                                        pw90, pw95, pw99 }

PredefinedConfigIdentity ::=        INTEGER (0..15)

PredefinedConfigValueTag ::=        INTEGER (0..15)

PredefinedRB-Configuration ::=      SEQUENCE {
    re-EstablishmentTimer               Re-EstablishmentTimer,
    srb-InformationList                 SRB-InformationSetupList,
    rb-InformationList                  RB-InformationSetupList
}

PreDefRadioConfiguration ::=        SEQUENCE {
    -- Radio bearer IEs
    predefinedRB-Configuration          PredefinedRB-Configuration,
    -- Transport channel IEs
    preDefTransChConfiguration          PreDefTransChConfiguration,
    -- Physical channel IEs
    preDefPhyChConfiguration            PreDefPhyChConfiguration
}

PredefinedConfigStatusList ::=              SEQUENCE (SIZE (maxPredefConfig)) OF
                                            PredefinedConfigStatusInfo
```

```
PredefinedConfigStatusInfo::=       CHOICE {
    storedWithValueTagSameAsPrevius     NULL,
    other                               CHOICE {
        notStored                           NULL,
        storedWithDifferentValueTag         PredefinedConfigValueTag
    }
}

RAB-Info ::=                        SEQUENCE {
    rab-Identity                        RAB-Identity,
    cn-DomainIdentity                   CN-DomainIdentity,
    nas-Synchronisation-Indicator       NAS-Synchronisation-Indicator   OPTIONAL,
    re-EstablishmentTimer               Re-EstablishmentTimer
}
RAB-InformationList         ::=     SEQUENCE (SIZE (1..maxRABsetup)) OF
                                        RAB-Info

RAB-InformationReconfigList ::=     SEQUENCE (SIZE (1.. maxRABsetup)) OF
                                        RAB-InformationReconfig

RAB-InformationReconfig ::=         SEQUENCE {
    rab-Identity                        RAB-Identity,
    cn-DomainIdentity                   CN-DomainIdentity,
    nas-Synchronisation-Indicator       NAS-Synchronisation-Indicator
}

RAB-Info-Post ::=                       SEQUENCE {
    rab-Identity                        RAB-Identity,
    cn-DomainIdentity                   CN-DomainIdentity,
    nas-Synchronisation-Indicator       NAS-Synchronisation-Indicator   OPTIONAL
}

RAB-InformationSetup ::=            SEQUENCE {
    rab-Info                            RAB-Info,
    rb-InformationSetupList             RB-InformationSetupList
}

RAB-InformationSetup-r4 ::=         SEQUENCE {
    rab-Info                            RAB-Info,
    rb-InformationSetupList             RB-InformationSetupList-r4
}

RAB-InformationSetupList ::=        SEQUENCE (SIZE (1..maxRABsetup)) OF
                                        RAB-InformationSetup

RAB-InformationSetupList-r4 ::=     SEQUENCE (SIZE (1..maxRABsetup)) OF
                                        RAB-InformationSetup-r4

RB-ActivationTimeInfo ::=           SEQUENCE {
    rb-Identity                         RB-Identity,
    rlc-SequenceNumber                  RLC-SequenceNumber
}

RB-ActivationTimeInfoList ::=       SEQUENCE (SIZE (1..maxRB)) OF
                                        RB-ActivationTimeInfo

RB-COUNT-C-Information ::=          SEQUENCE {
    rb-Identity                         RB-Identity,
    count-C-UL                          COUNT-C,
    count-C-DL                          COUNT-C
}

RB-COUNT-C-InformationList ::=      SEQUENCE (SIZE (1..maxRBallRABs)) OF
                                        RB-COUNT-C-Information

RB-COUNT-C-MSB-Information ::=      SEQUENCE {
    rb-Identity                         RB-Identity,
    count-C-MSB-UL                      COUNT-C-MSB,
    count-C-MSB-DL                      COUNT-C-MSB
}

RB-COUNT-C-MSB-InformationList ::=  SEQUENCE (SIZE (1..maxRBallRABs)) OF
                                        RB-COUNT-C-MSB-Information

RB-Identity ::=                     INTEGER (1..32)

RB-IdentityList ::=                 SEQUENCE (SIZE (1..maxRB)) OF
```

```
                                        RB-Identity

RB-InformationAffected ::=          SEQUENCE {
    rb-Identity                         RB-Identity,
    rb-MappingInfo                      RB-MappingInfo
}

RB-InformationAffectedList ::=      SEQUENCE (SIZE (1..maxRB)) OF
                                        RB-InformationAffected

RB-InformationReconfig ::=          SEQUENCE {
    rb-Identity                         RB-Identity,
    pdcp-Info                           PDCP-InfoReconfig                   OPTIONAL,
    pdcp-SN-Info                        PDCP-SN-Info                        OPTIONAL,
    rlc-Info                            RLC-Info                            OPTIONAL,
    rb-MappingInfo                      RB-MappingInfo                      OPTIONAL,
    rb-StopContinue                     RB-StopContinue                 OPTIONAL
}

RB-InformationReconfig-r4 ::=       SEQUENCE {
    rb-Identity                         RB-Identity,
    pdcp-Info                           PDCP-InfoReconfig-r4                OPTIONAL,
    rlc-Info                            RLC-Info                            OPTIONAL,
    rb-MappingInfo                      RB-MappingInfo                      OPTIONAL,
    rb-StopContinue                     RB-StopContinue                     OPTIONAL
}

RB-InformationReconfigList ::=      SEQUENCE (SIZE (1..maxRB)) OF
                                        RB-InformationReconfig

RB-InformationReconfigList-r4 ::=   SEQUENCE (SIZE (1..maxRB)) OF
                                        RB-InformationReconfig-r4

RB-InformationReleaseList ::=       SEQUENCE (SIZE (1..maxRB)) OF
                                        RB-Identity

RB-InformationSetup ::=             SEQUENCE {
    rb-Identity                         RB-Identity,
    pdcp-Info                           PDCP-Info                           OPTIONAL,
    rlc-InfoChoice                      RLC-InfoChoice,
    rb-MappingInfo                      RB-MappingInfo
}

RB-InformationSetup-r4 ::=          SEQUENCE {
    rb-Identity                         RB-Identity,
    pdcp-Info                           PDCP-Info-r4                        OPTIONAL,
    rlc-Info                            RLC-Info,
    rb-MappingInfo                      RB-MappingInfo
}

RB-InformationSetupList ::=         SEQUENCE (SIZE (1..maxRBperRAB)) OF
                                        RB-InformationSetup

RB-InformationSetupList-r4 ::=      SEQUENCE (SIZE (1..maxRBperRAB)) OF
                                        RB-InformationSetup-r4

RB-MappingInfo ::=                  SEQUENCE (SIZE (1..maxRBMuxOptions)) OF
                                        RB-MappingOption

RB-MappingOption ::=                SEQUENCE {
    ul-LogicalChannelMappings           UL-LogicalChannelMappings           OPTIONAL,
    dl-LogicalChannelMappingList        DL-LogicalChannelMappingList        OPTIONAL
}

RB-StopContinue ::=                 ENUMERATED {
                                        stopRB, continueRB }

RB-WithPDCP-Info ::=                SEQUENCE {
    rb-Identity                         RB-Identity,
    pdcp-SN-Info                        PDCP-SN-Info
}

RB-WithPDCP-InfoList ::=            SEQUENCE (SIZE (1..maxRBallRABs)) OF
                                        RB-WithPDCP-Info

ReceivingWindowSize ::=             ENUMERATED {
                                        rw1, rw8, rw16, rw32, rw64, rw128, rw256,
                                        rw512, rw768, rw1024, rw1536, rw2047,
```

```
                                    rw2560, rw3072, rw3584, rw4095 }

RFC2507-Info ::=                    SEQUENCE {
    f-MAX-PERIOD                        INTEGER (1..65535)                  DEFAULT 256,
    f-MAX-TIME                          INTEGER (1..255)                    DEFAULT 5,
    max-HEADER                          INTEGER (60..65535)                 DEFAULT 168,
    tcp-SPACE                           INTEGER (3..255)                    DEFAULT 15,
    non-TCP-SPACE                       INTEGER (3..65535)                  DEFAULT 15,
    expectReordering                    ExpectReordering
    -- TABULAR: The IE above has only two possible values, so using Optional or Default
    -- would be wasteful
}

RFC3095-Info-r4 ::=             SEQUENCE {
    cid-InclusionInfo                   CID-InclusionInfo-r4,
    max-CID                             INTEGER (1..16383)                  DEFAULT 15,
    rohcProfileList                     ROHC-ProfileList-r4,
    mrru                                INTEGER (0..65535)                  DEFAULT 0,
    rohcPacketSizeList                  ROHC-PacketSizeList-r4,
    reverseDecompressionDepth           INTEGER (0..65535)                  DEFAULT 0
}

RLC-Info ::=                        SEQUENCE {
    ul-RLC-Mode                         UL-RLC-Mode                         OPTIONAL,
    dl-RLC-Mode                         DL-RLC-Mode                         OPTIONAL
}

RLC-InfoChoice ::=                  CHOICE {
    rlc-Info                            RLC-Info,
    same-as-RB                          RB-Identity
}

RLC-SequenceNumber ::=              INTEGER (0..4095)

RLC-SizeInfo    ::=                 SEQUENCE {
    rlc-SizeIndex                       INTEGER (1..maxTF)
}

RLC-SizeExplicitList    ::=         SEQUENCE (SIZE  (1..maxTF)) OF
                                        RLC-SizeInfo

ROHC-Profile-r4 ::=                 INTEGER (1..3)

ROHC-ProfileList-r4 ::=             SEQUENCE (SIZE  (1..maxROHC-Profile-r4))    OF
                                        ROHC-Profile-r4

ROHC-PacketSize-r4  ::=             INTEGER (2..1500)

ROHC-PacketSizeList-r4 ::=          SEQUENCE (SIZE  (1..maxROHC-PacketSizes-r4))    OF
                                        ROHC-PacketSize-r4

SRB-InformationSetup ::=            SEQUENCE {
    rb-Identity                         RB-Identity                         OPTIONAL,
    -- The default value for the IE above is the smallest value not used yet.
    rlc-InfoChoice                      RLC-InfoChoice,
    rb-MappingInfo                      RB-MappingInfo
}

SRB-InformationSetupList ::=        SEQUENCE (SIZE (1..maxSRBsetup)) OF
                                        SRB-InformationSetup

SRB-InformationSetupList2 ::=       SEQUENCE (SIZE (3..4)) OF
                                        SRB-InformationSetup

TimerDiscard ::=                    ENUMERATED {
                                        td0-1, td0-25, td0-5, td0-75,
                                        td1, td1-25, td1-5, td1-75,
                                        td2, td2-5, td3, td3-5, td4,
                                        td4-5, td5, td7-5 }

TimerEPC ::=                        ENUMERATED {
                                        te50, te60, te70, te80, te90,
                                        te100, te120, te140, te160, te180,
                                        te200, te300, te400, te500, te700,
                                        te900 }

TimerMRW ::=                        ENUMERATED {
                                        te50, te60, te70, te80, te90, te100,
```

```
                                        te120, te140, te160, te180, te200,
                                        te300, te400, te500, te700, te900 }

TimerPoll ::=                       ENUMERATED {
                                        tp10, tp20, tp30, tp40, tp50,
                                        tp60, tp70, tp80, tp90, tp100,
                                        tp110, tp120, tp130, tp140, tp150,
                                        tp160, tp170, tp180, tp190, tp200,
                                        tp210, tp220, tp230, tp240, tp250,
                                        tp260, tp270, tp280, tp290, tp300,
                                        tp310, tp320, tp330, tp340, tp350,
                                        tp360, tp370, tp380, tp390, tp400,
                                        tp410, tp420, tp430, tp440, tp450,
                                        tp460, tp470, tp480, tp490, tp500,
                                        tp510, tp520, tp530, tp540, tp550,
                                        tp600, tp650, tp700, tp750, tp800,
                                        tp850, tp900, tp950, tp1000 }

TimerPollPeriodic ::=               ENUMERATED {
                                        tper100, tper200, tper300, tper400,
                                        tper500, tper750, tper1000, tper2000 }

TimerPollProhibit ::=               ENUMERATED {
                                        tpp10, tpp20, tpp30, tpp40, tpp50,
                                        tpp60, tpp70, tpp80, tpp90, tpp100,
                                        tpp110, tpp120, tpp130, tpp140, tpp150,
                                        tpp160, tpp170, tpp180, tpp190, tpp200,
                                        tpp210, tpp220, tpp230, tpp240, tpp250,
                                        tpp260, tpp270, tpp280, tpp290, tpp300,
                                        tpp310, tpp320, tpp330, tpp340, tpp350,
                                        tpp360, tpp370, tpp380, tpp390, tpp400,
                                        tpp410, tpp420, tpp430, tpp440, tpp450,
                                        tpp460, tpp470, tpp480, tpp490, tpp500,
                                        tpp510, tpp520, tpp530, tpp540, tpp550,
                                        tpp600, tpp650, tpp700, tpp750, tpp800,
                                        tpp850, tpp900, tpp950, tpp1000 }

TimerRST ::=                        ENUMERATED {
                                        tr50, tr100, tr150, tr200, tr250, tr300,
                                        tr350, tr400, tr450, tr500, tr550,
                                        tr600, tr700, tr800, tr900, tr1000 }

TimerStatusPeriodic ::=             ENUMERATED {
                                        tsp100, tsp200, tsp300, tsp400, tsp500,
                                        tsp750, tsp1000, tsp2000 }

TimerStatusProhibit ::=             ENUMERATED {
                                        tsp10,tsp20,tsp30,tsp40,tsp50,
                                        tsp60,tsp70,tsp80,tsp90,tsp100,
                                        tsp110,tsp120,tsp130,tsp140,tsp150,
                                        tsp160,tsp170,tsp180,tsp190,tsp200,
                                        tsp210,tsp220,tsp230,tsp240,tsp250,
                                        tsp260,tsp270,tsp280,tsp290,tsp300,
                                        tsp310,tsp320,tsp330,tsp340,tsp350,
                                        tsp360,tsp370,tsp380,tsp390,tsp400,
                                        tsp410,tsp420,tsp430,tsp440,tsp450,
                                        tsp460,tsp470,tsp480,tsp490,tsp500,
                                        tsp510,tsp520,tsp530,tsp540,tsp550,
                                        tsp600,tsp650,tsp700,tsp750,tsp800,
                                        tsp850,tsp900,tsp950,tsp1000 }

TransmissionRLC-Discard ::=         CHOICE {
    timerBasedExplicit                  ExplicitDiscard,
    timerBasedNoExplicit                NoExplicitDiscard,
    maxDAT-Retransmissions              MaxDAT-Retransmissions,
    noDiscard                           MaxDAT
}

TransmissionWindowSize ::=          ENUMERATED {
                                        tw1, tw8, tw16, tw32, tw64, tw128, tw256,
                                        tw512, tw768, tw1024, tw1536, tw2047,
                                        tw2560, tw3072, tw3584, tw4095 }

UL-AM-RLC-Mode ::=                  SEQUENCE {
    transmissionRLC-Discard             TransmissionRLC-Discard,
    transmissionWindowSize              TransmissionWindowSize,
    timerRST                            TimerRST,
    max-RST                             MaxRST,
```

```
    pollingInfo                         PollingInfo                         OPTIONAL
}

UL-CounterSynchronisationInfo ::=       SEQUENCE {
    rB-WithPDCP-InfoList                    RB-WithPDCP-InfoList    OPTIONAL,
    startList                               STARTList
}

UL-LogicalChannelMapping ::=        SEQUENCE {
    -- TABULAR: UL-TransportChannelType contains TransportChannelIdentity as well.
    ul-TransportChannelType             UL-TransportChannelType,
    logicalChannelIdentity              LogicalChannelIdentity              OPTIONAL,
    rlc-SizeList                        CHOICE {
        allSizes                            NULL,
        configured                          NULL,
        explicitList                        RLC-SizeExplicitList
    },
    mac-LogicalChannelPriority          MAC-LogicalChannelPriority
}

UL-LogicalChannelMappingList ::=    SEQUENCE {
    rlc-LogicalChannelMappingIndicator  BOOLEAN,    -- NOTE: This parameter shall be set to TRUE in
this release
    ul-LogicalChannelMapping            SEQUENCE (SIZE (maxLoCHperRLC)) OF
                                        UL-LogicalChannelMapping
}

UL-LogicalChannelMappings ::=       CHOICE {
    oneLogicalChannel                   UL-LogicalChannelMapping,
    twoLogicalChannels                  UL-LogicalChannelMappingList
}

UL-RLC-Mode ::=                     CHOICE {
    ul-AM-RLC-Mode                      UL-AM-RLC-Mode,
    ul-UM-RLC-Mode                      UL-UM-RLC-Mode,
    ul-TM-RLC-Mode                      UL-TM-RLC-Mode,
    spare                               NULL
}

UL-TM-RLC-Mode ::=                  SEQUENCE {
    transmissionRLC-Discard             TransmissionRLC-Discard             OPTIONAL,
    segmentationIndication              BOOLEAN
}

UL-UM-RLC-Mode ::=                  SEQUENCE {
    transmissionRLC-Discard             TransmissionRLC-Discard             OPTIONAL

}

UL-TransportChannelType ::=         CHOICE {
    dch                                 TransportChannelIdentity,
    rach                                NULL,
    cpch                                NULL,
    usch                                TransportChannelIdentity
}

-- ***************************************************
--
--      TRANSPORT CHANNEL INFORMATION ELEMENTS (10.3.5)
--
-- ***************************************************

AllowedTFC-List ::=                 SEQUENCE (SIZE (1..maxTFC)) OF
                                        TFC-Value

AllowedTFI-List ::=                 SEQUENCE (SIZE (1..maxTF)) OF
                                        INTEGER (0..31)

BitModeRLC-SizeInfo ::=             CHOICE {
    sizeType1                           INTEGER (0..127),
    sizeType2                           SEQUENCE {
        part1                               INTEGER (0..15),
        part2                               INTEGER (1..7)                  OPTIONAL
        -- Actual size = (part1 * 8) + 128 + part2
    },
    sizeType3                           SEQUENCE {
        part1                               INTEGER (0..47),
        part2                               INTEGER (1..15)                 OPTIONAL
```

```
        -- Actual size = (part1 * 16) + 256 + part2
    },
    sizeType4                           SEQUENCE {
        part1                               INTEGER (0..62),
        part2                               INTEGER (1..63)                 OPTIONAL
        -- Actual size = (part1 * 64) + 1024 + part2
    }
}
-- Actual value = IE value * 0.1
BLER-QualityValue ::=               INTEGER (-63..0)

ChannelCodingType ::=               CHOICE {
    noCoding                            NULL,
    convolutional                       CodingRate,
    turbo                               NULL
}

CodingRate ::=                      ENUMERATED {
                                        half,
                                        third }

CommonDynamicTF-Info ::=            SEQUENCE {
    rlc-Size                            CHOICE {
        fdd                                 SEQUENCE {
            octetModeRLC-SizeInfoType2          OctetModeRLC-SizeInfoType2
        },
        tdd                                 SEQUENCE {
            commonTDD-Choice                    CHOICE {
                bitModeRLC-SizeInfo                 BitModeRLC-SizeInfo,
                octetModeRLC-SizeInfoType1          OctetModeRLC-SizeInfoType1
            }
        }
    },
    numberOfTbSizeList              SEQUENCE (SIZE (1..maxTF)) OF
                                            NumberOfTransportBlocks,
    logicalChannelList              LogicalChannelList
}

CommonDynamicTF-Info-DynamicTTI ::= SEQUENCE {
    commonTDD-Choice                    CHOICE {
        bitModeRLC-SizeInfo                 BitModeRLC-SizeInfo,
        octetModeRLC-SizeInfoType1          OctetModeRLC-SizeInfoType1
    },
    numberOfTbSizeAndTTIList            NumberOfTbSizeAndTTIList,
    logicalChannelList                  LogicalChannelList
}

CommonDynamicTF-InfoList ::=        SEQUENCE (SIZE (1..maxTF)) OF
                                        CommonDynamicTF-Info

CommonDynamicTF-InfoList-DynamicTTI ::= SEQUENCE (SIZE (1..maxTF)) OF
                                        CommonDynamicTF-Info-DynamicTTI

CommonTransChTFS ::=                SEQUENCE {
    tti                                 CHOICE {
        tti10                               CommonDynamicTF-InfoList,
        tti20                               CommonDynamicTF-InfoList,
        tti40                               CommonDynamicTF-InfoList,
        tti80                               CommonDynamicTF-InfoList,
        dynamic                             CommonDynamicTF-InfoList-DynamicTTI
    },
    semistaticTF-Information            SemistaticTF-Information
}

CommonTransChTFS-LCR ::=                SEQUENCE {
    tti                                 CHOICE {
        tti5                                CommonDynamicTF-InfoList,
        tti10                               CommonDynamicTF-InfoList,
        tti20                               CommonDynamicTF-InfoList,
        tti40                               CommonDynamicTF-InfoList,
        tti80                               CommonDynamicTF-InfoList,
        dynamic                             CommonDynamicTF-InfoList-DynamicTTI
    },
    semistaticTF-Information            SemistaticTF-Information
}

CPCH-SetID ::=                      INTEGER (1..maxCPCHsets)
```

```
CRC-Size ::=                        ENUMERATED {
                                        crc0, crc8, crc12, crc16, crc24 }

DedicatedDynamicTF-Info ::=         SEQUENCE {
    rlc-Size                            CHOICE {
        bitMode                             BitModeRLC-SizeInfo,
        octetModeType1                      OctetModeRLC-SizeInfoType1
    },
    numberOfTbSizeList              SEQUENCE (SIZE (1..maxTF)) OF
    NumberOfTransportBlocks,
    logicalChannelList              LogicalChannelList
}

DedicatedDynamicTF-Info-DynamicTTI ::= SEQUENCE {
    rlc-Size                            CHOICE {
        bitMode                             BitModeRLC-SizeInfo,
        octetModeType1                      OctetModeRLC-SizeInfoType1
    },
    numberOfTbSizeAndTTIList            NumberOfTbSizeAndTTIList,
    logicalChannelList              LogicalChannelList
}

DedicatedDynamicTF-InfoList ::=     SEQUENCE (SIZE (1..maxTF)) OF
                                        DedicatedDynamicTF-Info

DedicatedDynamicTF-InfoList-DynamicTTI ::= SEQUENCE (SIZE (1..maxTF)) OF
                                        DedicatedDynamicTF-Info-DynamicTTI

DedicatedTransChTFS ::=             SEQUENCE {
    tti                                 CHOICE {
        tti10                               DedicatedDynamicTF-InfoList,
        tti20                               DedicatedDynamicTF-InfoList,
        tti40                               DedicatedDynamicTF-InfoList,
        tti80                               DedicatedDynamicTF-InfoList,
        dynamic                             DedicatedDynamicTF-InfoList-DynamicTTI
    },
    semistaticTF-Information            SemistaticTF-Information
}

-- The maximum allowed size of this sequence is 16
DL-AddReconfTransChInfo2List ::=    SEQUENCE (SIZE (1..maxTrCHpreconf)) OF
                                        DL-AddReconfTransChInformation2

-- The maximum allowed size of this sequence is 16
DL-AddReconfTransChInfoList ::=     SEQUENCE (SIZE (1..maxTrCHpreconf)) OF
                                        DL-AddReconfTransChInformation

-- ASN.1 for IE "Added or Reconfigured DL TrCH information"
-- in case of messages other than: Radio Bearer Release message and
-- Radio Bearer Reconfiguration message
DL-AddReconfTransChInformation ::=  SEQUENCE {
    dl-TransportChannelType             DL-TrCH-Type,
    dl-transportChannelIdentity         TransportChannelIdentity,
    tfs-SignallingMode                  CHOICE {
        explicit-config                     TransportFormatSet,
        sameAsULTrCH                        UL-TransportChannelIdentity
    },
    dch-QualityTarget                   QualityTarget                       OPTIONAL,
    tm-SignallingInfo                   TM-SignallingInfo                   OPTIONAL
}

-- ASN.1 for IE "Added or Reconfigured DL TrCH information"
-- in case of Radio Bearer Release message and
-- Radio Bearer Reconfiguration message
DL-AddReconfTransChInformation2 ::= SEQUENCE {
    dl-TransportChannelType             DL-TrCH-Type,
    transportChannelIdentity            TransportChannelIdentity,
    tfs-SignallingMode                  CHOICE {
        explicit-config                     TransportFormatSet,
        sameAsULTrCH                        UL-TransportChannelIdentity
    },
    qualityTarget                       QualityTarget                       OPTIONAL
}

DL-CommonTransChInfo ::=            SEQUENCE {
    sccpch-TFCS                         TFCS                                OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
```

```
            dl-Parameters                       CHOICE {
                dl-DCH-TFCS                         TFCS,
                sameAsUL                            NULL
            }                                                               OPTIONAL
        },
        tdd                                 SEQUENCE {
            individualDL-CCTrCH-InfoList        IndividualDL-CCTrCH-InfoList
                                                                            OPTIONAL
        }
    }
}
    -- NOTE: CHOICE modeSpecificInfo should be optional. A new version of this IE
    -- should be defined to be used in later versions of messages using this IE

DL-CommonTransChInfo-r4 ::=         SEQUENCE {
    sccpch-TFCS                         TFCS                                OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            dl-Parameters                       CHOICE {
                dl-DCH-TFCS                         SEQUENCE {
                    tfcs                                TFCS                OPTIONAL
                },
                sameAsUL                            NULL
            }                                                               OPTIONAL
        },
        tdd                                 SEQUENCE {
            individualDL-CCTrCH-InfoList        IndividualDL-CCTrCH-InfoList
                                                                            OPTIONAL
        }
    }
}

DL-DeletedTransChInfoList ::=       SEQUENCE (SIZE (1..maxTrCH)) OF
                                        DL-TransportChannelIdentity

DL-TransportChannelIdentity ::=         SEQUENCE {
    dl-TransportChannelType             DL-TrCH-Type,
    dl-TransportChannelIdentity         TransportChannelIdentity
}

DL-TrCH-Type ::= ENUMERATED {dch, dsch}

DRAC-ClassIdentity ::=              INTEGER (1..maxDRACclasses)

DRAC-StaticInformation ::=          SEQUENCE {
    transmissionTimeValidity            TransmissionTimeValidity,
    timeDurationBeforeRetry             TimeDurationBeforeRetry,
    drac-ClassIdentity                  DRAC-ClassIdentity
}

DRAC-StaticInformationList ::=      SEQUENCE (SIZE (1..maxTrCH)) OF
                                        DRAC-StaticInformation

ExplicitTFCS-Configuration ::=      CHOICE {
    complete                            TFCS-ReconfAdd,
    addition                            TFCS-ReconfAdd,
    removal                             TFCS-RemovalList,
    replacement                         SEQUENCE {
        tfcsRemoval                         TFCS-RemovalList,
        tfcsAdd                             TFCS-ReconfAdd
    }
}

GainFactor ::=                      INTEGER (0..15)

GainFactorInformation ::=           CHOICE {
    signalledGainFactors                SignalledGainFactors,
    computedGainFactors                 ReferenceTFC-ID
}

IndividualDL-CCTrCH-Info ::=        SEQUENCE {
    dl-TFCS-Identity                    TFCS-Identity,
    tfcs-SignallingMode                 CHOICE {
        explicit-config                     TFCS,
        sameAsUL                            TFCS-Identity
    }
}
```

```
IndividualDL-CCTrCH-InfoList ::=    SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        IndividualDL-CCTrCH-Info

IndividualUL-CCTrCH-Info ::=        SEQUENCE {
    ul-TFCS-Identity                    TFCS-Identity,
    ul-TFCS                             TFCS ,
    tfc-Subset                          TFC-Subset
}

IndividualUL-CCTrCH-InfoList ::=    SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        IndividualUL-CCTrCH-Info

LogicalChannelByRB          ::=     SEQUENCE {
    rb-Identity                         RB-Identity,
    logChOfRb                           INTEGER (0..1)                      OPTIONAL
}

LogicalChannelList  ::=             CHOICE {
        allSizes                            NULL,
        configured                          NULL,
        explicitList                        SEQUENCE (SIZE (1..15)) OF
                                                LogicalChannelByRB
}

NumberOfTbSizeAndTTIList    ::=     SEQUENCE (SIZE (1..maxTF)) OF SEQUENCE {
        numberOfTransportBlocks             NumberOfTransportBlocks,
        transmissionTimeInterval            TransmissionTimeInterval
}

MessType ::=                        ENUMERATED {
                                        transportFormatCombinationControl }

Non-allowedTFC-List ::=             SEQUENCE (SIZE (1..maxTFC)) OF
                                        TFC-Value

NumberOfTransportBlocks::=          CHOICE {
    zero                                NULL,
    one                                 NULL,
    small                               INTEGER (2..17),
    large                               INTEGER (18..512)
}

OctetModeRLC-SizeInfoType1 ::=      CHOICE {
    sizeType1                           INTEGER (0..31),
    -- Actual size = (8 * sizeType1) + 16
    sizeType2                           SEQUENCE {
        part1                               INTEGER (0..23),
        part2                               INTEGER (1..3)                  OPTIONAL
        -- Actual size = (32 * part1) + 272 + (part2 * 8)
    },
    sizeType3                           SEQUENCE {
        part1                               INTEGER (0..61),
        part2                               INTEGER (1..7)                  OPTIONAL
        -- Actual size = (64 * part1) + 1040 + (part2 * 8)
    }
}

OctetModeRLC-SizeInfoType2 ::=      CHOICE {
    sizeType1                           INTEGER (0..31),
    -- Actual size = (sizeType1 * 8) + 48
    sizeType2                           INTEGER (0..63),
    -- Actual size = (sizeType2 * 16) + 312
    sizeType3                           INTEGER (0..56)
    -- Actual size = (sizeType3 *64) + 1384
}

PowerOffsetInformation ::=          SEQUENCE {
    gainFactorInformation               GainFactorInformation,
    -- PowerOffsetPp-m is always absent in TDD
    powerOffsetPp-m                     PowerOffsetPp-m                     OPTIONAL
}

PowerOffsetPp-m ::=                 INTEGER (-5..10)

PreDefTransChConfiguration ::=      SEQUENCE {
    ul-CommonTransChInfo                UL-CommonTransChInfo,
    ul-AddReconfTrChInfoList            UL-AddReconfTransChInfoList,
    dl-CommonTransChInfo                DL-CommonTransChInfo,
```

```
	dl-TrChInfoList						DL-AddReconfTransChInfoList
}

QualityTarget ::=					SEQUENCE {
	bler-QualityValue					BLER-QualityValue
}

RateMatchingAttribute ::=			INTEGER (1..hiRM)


ReferenceTFC-ID ::=					INTEGER (0..3)

RestrictedTrChInfo ::=				SEQUENCE {
	ul-TransportChannelType				UL-TrCH-Type,
	restrictedTrChIdentity				TransportChannelIdentity,
	allowedTFI-List						AllowedTFI-List						OPTIONAL
}

RestrictedTrChInfoList ::=			SEQUENCE (SIZE (1..maxTrCH)) OF
										RestrictedTrChInfo

SemistaticTF-Information ::=		SEQUENCE {
	-- TABULAR: Transmission time interval has been included in the IE CommonTransChTFS.
	channelCodingType					ChannelCodingType,
	rateMatchingAttribute				RateMatchingAttribute,
	crc-Size							CRC-Size
}

SignalledGainFactors ::=			SEQUENCE {
	modeSpecificInfo					CHOICE {
		fdd									SEQUENCE {
			gainFactorBetaC						GainFactor
		},
		tdd									NULL
	},
	gainFactorBetaD						GainFactor,
	referenceTFC-ID						ReferenceTFC-ID						OPTIONAL
}

SplitTFCI-Signalling ::=			SEQUENCE {
	splitType							SplitType						OPTIONAL,
	tfci-Field2-Length					INTEGER (1..10)					OPTIONAL,
	tfci-Field1-Information				ExplicitTFCS-Configuration		OPTIONAL,
	tfci-Field2-Information				TFCI-Field2-Information			OPTIONAL
}

SplitType ::=						ENUMERATED {
										hardSplit, logicalSplit }

TFC-Subset ::=						CHOICE {
	minimumAllowedTFC-Number			TFC-Value,
	allowedTFC-List						AllowedTFC-List,
	non-allowedTFC-List					Non-allowedTFC-List,
	restrictedTrChInfoList				RestrictedTrChInfoList,
	fullTFCS							NULL
}

TFC-Value ::=						INTEGER (0..1023)

TFCI-Field2-Information ::=			CHOICE {
	tfci-Range							TFCI-RangeList,
	explicit-config						ExplicitTFCS-Configuration
}

TFCI-Range ::=						SEQUENCE {
	maxTFCIField2Value					INTEGER (1..1023),
	tfcs-InfoForDSCH					TFCS-InfoForDSCH
}

TFCI-RangeList ::=					SEQUENCE (SIZE (1..maxPDSCH-TFCIgroups)) OF
										TFCI-Range

TFCS ::=							CHOICE {
	normalTFCI-Signalling				ExplicitTFCS-Configuration,
	splitTFCI-Signalling				SplitTFCI-Signalling
}

TFCS-Identity ::=					SEQUENCE {
```

```
	tfcs-ID						TFCS-IdentityPlain			DEFAULT 1,
	sharedChannelIndicator		BOOLEAN
}

TFCS-IdentityPlain ::=			INTEGER (1..8)

TFCS-InfoForDSCH ::=			CHOICE {
	ctfc2bit						INTEGER (0..3),
	ctfc4bit						INTEGER (0..15),
	ctfc6bit						INTEGER (0..63),
	ctfc8bit						INTEGER (0..255),
	ctfc12bit						INTEGER (0..4095),
	ctfc16bit						INTEGER (0..65535),
	ctfc24bit						INTEGER (0..16777215)
}

TFCS-ReconfAdd ::=				SEQUENCE{
	ctfcSize						CHOICE{
		ctfc2Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc2							INTEGER (0..3),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc4Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc4							INTEGER (0..15),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc6Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc6							INTEGER (0..63),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc8Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc8							INTEGER (0..255),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc12Bit						SEQUENCE (SIZE(1..maxTFC)) OF SEQUENCE {
			ctfc12							INTEGER (0..4095),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc16Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc16							INTEGER(0..65535),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		},
		ctfc24Bit						SEQUENCE (SIZE (1..maxTFC)) OF SEQUENCE {
			ctfc24							INTEGER(0..16777215),
			powerOffsetInformation			PowerOffsetInformation		OPTIONAL
		}
	}
}

TFCS-Removal ::=				SEQUENCE {
	tfci							INTEGER (0..1023)
}

TFCS-RemovalList ::=			SEQUENCE (SIZE (1..maxTFC)) OF
									TFCS-Removal

TimeDurationBeforeRetry ::=		INTEGER (1..256)

TM-SignallingInfo	::=			SEQUENCE {
	messType						MessType,
	tm-SignallingMode				CHOICE {
		mode1							NULL,
		mode2							SEQUENCE {
			--TrCH-Type is always DCH
			ul-controlledTrChList			UL-ControlledTrChList
		}
	}
}

TransmissionTimeInterval ::=	ENUMERATED {
									tti10, tti20, tti40, tti80 }

TransmissionTimeValidity ::=	INTEGER (1..256)

TransportChannelIdentity ::=	INTEGER (1..32)

TransportChannelIdentityDCHandDSCH	::= SEQUENCE {
	dch-transport-ch-id			TransportChannelIdentity,
```

```
    dsch-transport-ch-id            TransportChannelIdentity
}

TransportFormatSet ::=              CHOICE {
    dedicatedTransChTFS                 DedicatedTransChTFS,
    commonTransChTFS                    CommonTransChTFS
}

TransportFormatSet-LCR ::=              CHOICE {
    dedicatedTransChTFS                 DedicatedTransChTFS,
    commonTransChTFS-LCR                CommonTransChTFS-LCR
}

-- The maximum allowed size of this sequence is 16
UL-AddReconfTransChInfoList ::=     SEQUENCE (SIZE (1..maxTrCHpreconf)) OF
                                        UL-AddReconfTransChInformation

UL-AddReconfTransChInformation ::= SEQUENCE {
    ul-TransportChannelType             UL-TrCH-Type,
    transportChannelIdentity            TransportChannelIdentity,
    transportFormatSet                  TransportFormatSet
}

UL-CommonTransChInfo ::=            SEQUENCE {
-- TABULAR: this tfc-subset IE is applicable to FDD only, TDD specifies tfc-subset in individual
-- CCTrCH Info.
    tfc-Subset                          TFC-Subset                          OPTIONAL,
    prach-TFCS                          TFCS                                OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ul-TFCS                         TFCS
        },
        tdd                                 SEQUENCE {

            individualUL-CCTrCH-InfoList        IndividualUL-CCTrCH-InfoList
                                                                            OPTIONAL
        }
    }                                                                       OPTIONAL
}

-- TrCH-Type is always DCH
UL-ControlledTrChList ::=           SEQUENCE (SIZE (1..maxTrCH)) OF
                                        TransportChannelIdentity

UL-DeletedTransChInfoList ::=       SEQUENCE (SIZE (1..maxTrCH)) OF
                                        UL-TransportChannelIdentity

UL-TransportChannelIdentity ::=     SEQUENCE {
    ul-TransportChannelType             UL-TrCH-Type,
    ul-TransportChannelIdentity         TransportChannelIdentity
}

UL-TrCH-Type ::= ENUMERATED {dch, usch}

-- ***************************************************
--
--      PHYSICAL CHANNEL INFORMATION ELEMENTS (10.3.6)
--
-- ***************************************************

AC-To-ASC-Mapping ::=               INTEGER (0..7)

AC-To-ASC-MappingTable ::=          SEQUENCE (SIZE (maxASCmap)) OF
                                        AC-To-ASC-Mapping

AccessServiceClass-FDD ::=          SEQUENCE {
    availableSignatureStartIndex        INTEGER (0..15),
    availableSignatureEndIndex          INTEGER (0..15),

    assignedSubChannelNumber            BIT STRING {
                                            b3(0),
                                            b2(1),
                                            b1(2),
                                            b0(3)
                                            }   (SIZE(4))
}

AccessServiceClass-TDD ::=          SEQUENCE {
```

```
    channelisationCodeIndices           BIT STRING  {
                                            chCodeIndex7(0),
                                            chCodeIndex6(1),
                                            chCodeIndex5(2),
                                            chCodeIndex4(3),
                                            chCodeIndex3(4),
                                            chCodeIndex2(5),
                                            chCodeIndex1(6),
                                            chCodeIndex0(7)
                                            } (SIZE(8))             OPTIONAL,
    subchannelSize                      CHOICE {
        size1                               NULL,
-- in size2, subch0 means bitstring '01' in the tabular, subch1 means bitsring '10'.
        size2                               SEQUENCE {
            subchannels                         ENUMERATED  { subch0, subch1 }  OPTIONAL
        },
        size4                               SEQUENCE {
            subchannels                         BIT STRING  {
                                                    subCh3(0),
                                                    subCh2(1),
                                                    subCh1(2),
                                                    subCh0(3)
                                                    } (SIZE(4))     OPTIONAL
        },
        size8                               SEQUENCE {
            subchannels                         BIT STRING  {
                                                    subCh7(0),
                                                    subCh6(1),
                                                    subCh5(2),
                                                    subCh4(3),
                                                    subCh3(4),
                                                    subCh2(5),
                                                    subCh1(6),
                                                    subCh0(7)
                                                    } (SIZE(8))     OPTIONAL
        }
    }
}

AccessServiceClass-TDD-LCR-r4 ::=   SEQUENCE {
    availableSYNC-UlCodesIndics         BIT STRING {
                                            sulCodeIndex7(0),
                                            sulCodeIndex6(1),
                                            sulCodeIndex5(2),
                                            sulCodeIndex4(3),
                                            sulCodeIndex3(4),
                                            sulCodeIndex2(5),
                                            sulCodeIndex1(6),
                                            sulCodeIndex0(7)
                                            } (SIZE(8))               OPTIONAL,
    subchannelSize                      CHOICE {
        size1                               NULL,
-- in size2, subch0 means bitstring '01' in the tabular, subch1 means bitsring '10'.
        size2                               SEQUENCE {
            subchannels                         ENUMERATED  { subch0, subch1 }  OPTIONAL
        },
        size4                               SEQUENCE {
            subchannels                         BIT STRING  {
                                                    subCh3(0),
                                                    subCh2(1),
                                                    subCh1(2),
                                                    subCh0(3)
                                                    } (SIZE(4))         OPTIONAL
        },
        size8                               SEQUENCE {
            subchannels                         BIT STRING  {
                                                    subCh7(0),
                                                    subCh6(1),
                                                    subCh5(2),
                                                    subCh4(3),
                                                    subCh3(4),
                                                    subCh2(5),
                                                    subCh1(6),
                                                    subCh0(7)
                                                    } (SIZE(8))         OPTIONAL
        }
    }
```

```
}

AICH-Info ::=                       SEQUENCE {
    channelisationCode256               ChannelisationCode256,
    sttd-Indicator                      BOOLEAN,
    aich-TransmissionTiming             AICH-TransmissionTiming
}

AICH-PowerOffset ::=                INTEGER (-22..5)

AICH-TransmissionTiming ::=         ENUMERATED {
                                        e0, e1 }

AllocationPeriodInfo ::=            SEQUENCE {
    allocationActivationTime            INTEGER (0..255),
    allocationDuration                  INTEGER (1..256)
}
-- Actual value = IE value * 0.125
Alpha ::=                           INTEGER (0..8)

AP-AICH-ChannelisationCode ::=      INTEGER (0..255)

AP-PreambleScramblingCode ::=       INTEGER (0..79)

AP-Signature ::=                    INTEGER (0..15)

AP-Signature-VCAM ::=               SEQUENCE {
    ap-Signature                        AP-Signature,
    availableAP-SubchannelList          AvailableAP-SubchannelList OPTIONAL
}

AP-Subchannel ::=                   INTEGER (0..11)

ASCSetting-FDD ::=                      SEQUENCE {
    -- TABULAR: This is MD in tabular description
    -- Default value is previous ASC
    -- If this is the first ASC, the default value is all available signature and sub-channels
    accessServiceClass-FDD                  AccessServiceClass-FDD  OPTIONAL
}

ASCSetting-TDD ::=                      SEQUENCE {
    -- TABULAR: This is MD in tabular description
    -- Default value is previous ASC
    -- If this is the first ASC, the default value is all available channelisation codes and
    -- all available sub-channels with subchannelSize=size1.
    accessServiceClass-TDD                  AccessServiceClass-TDD  OPTIONAL
}

ASCSetting-TDD-LCR-r4 ::=                       SEQUENCE {
    -- TABULAR: This is MD in tabular description
    -- Default value is previous ASC
    -- If this is the first ASC, the default value is all available SYNC_UL codes and
    -- all available sub-channels with subchannelSize=size1.
    accessServiceClass-TDD-LCR                  AccessServiceClass-TDD-LCR-r4   OPTIONAL
}

AvailableAP-Signature-VCAMList ::=  SEQUENCE (SIZE (1..maxPCPCH-APsig)) OF
                                        AP-Signature-VCAM

AvailableAP-SignatureList ::=       SEQUENCE (SIZE (1..maxPCPCH-APsig)) OF
                                        AP-Signature

AvailableAP-SubchannelList ::=      SEQUENCE (SIZE (1..maxPCPCH-APsubCh)) OF
                                        AP-Subchannel

AvailableMinimumSF-ListVCAM ::=     SEQUENCE (SIZE (1..maxPCPCH-SF)) OF
                                        AvailableMinimumSF-VCAM

AvailableMinimumSF-VCAM ::=         SEQUENCE {
    minimumSpreadingFactor              MinimumSpreadingFactor,
    nf-Max                              NF-Max,
    maxAvailablePCPCH-Number            MaxAvailablePCPCH-Number,
    availableAP-Signature-VCAMList      AvailableAP-Signature-VCAMList
}

AvailableSignatures ::=         BIT STRING {
                                    signature15(0),
                                    signature14(1),
```

```
                                    signature13(2),
                                    signature12(3),
                                    signature11(4),
                                    signature10(5),
                                    signature9(6),
                                    signature8(7),
                                    signature7(8),
                                    signature6(9),
                                    signature5(10),
                                    signature4(11),
                                    signature3(12),
                                    signature2(13),
                                    signature1(14),
                                    signature0(15)
                                    }    (SIZE(16))

AvailableSubChannelNumbers ::=      BIT STRING {
                                        subCh11(0),
                                        subCh10(1),
                                        subCh9(2),
                                        subCh8(3),
                                        subCh7(4),
                                        subCh6(5),
                                        subCh5(6),
                                        subCh4(7),
                                        subCh3(8),
                                        subCh2(9),
                                        subCh1(10),
                                        subCh0(11)
                                        }    (SIZE(12))

BurstType ::=                       ENUMERATED {
                                        short1, long2 }

CCTrCH-PowerControlInfo ::=         SEQUENCE {
    tfcs-Identity                       TFCS-Identity                       OPTIONAL,
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfo
}

CCTrCH-PowerControlInfo-r4 ::=      SEQUENCE {
    tfcs-Identity                       TFCS-Identity                       OPTIONAL,
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfo-r4
}

CD-AccessSlotSubchannel ::=         INTEGER (0..11)

CD-AccessSlotSubchannelList ::=     SEQUENCE (SIZE (1..maxPCPCH-CDsubCh)) OF
                                        CD-AccessSlotSubchannel

CD-CA-ICH-ChannelisationCode ::=    INTEGER (0..255)

CD-PreambleScramblingCode ::=       INTEGER (0..79)

CD-SignatureCode ::=                INTEGER (0..15)

CD-SignatureCodeList ::=            SEQUENCE (SIZE (1..maxPCPCH-CDsig)) OF
                                        CD-SignatureCode

CellAndChannelIdentity ::=          SEQUENCE {
    burstType                           BurstType,
    midambleShift                       MidambleShiftLong,
    timeslot                            TimeslotNumber,
    cellParametersID                    CellParametersID
    }

CellParametersID ::=                INTEGER (0..127)

Cfntargetsfnframeoffset ::=             INTEGER(0..255)

ChannelAssignmentActive ::=         CHOICE {
    notActive                           NULL,
    isActive                            AvailableMinimumSF-ListVCAM
}

ChannelisationCode256 ::=           INTEGER (0..255)

ChannelReqParamsForUCSM ::=         SEQUENCE {
    availableAP-SignatureList           AvailableAP-SignatureList,
```

```
	availableAP-SubchannelList			AvailableAP-SubchannelList			OPTIONAL
}

ClosedLoopTimingAdjMode ::=			ENUMERATED {
										slot1, slot2 }

CodeNumberDSCH ::=					INTEGER (0..255)

CodeRange ::=						SEQUENCE {
	pdsch-CodeMapList					PDSCH-CodeMapList
}

CodeWordSet ::=						ENUMERATED {
										longCWS,
										mediumCWS,
										shortCWS,
										ssdtOff }

CommonTimeslotInfo ::=				SEQUENCE {
	-- TABULAR: The IE below is MD, but since it can be encoded in a single
	-- bit it is not defined as OPTIONAL.
	secondInterleavingMode				SecondInterleavingMode,
	tfci-Coding							TFCI-Coding							OPTIONAL,
	puncturingLimit						PuncturingLimit,
	repetitionPeriodAndLength			RepetitionPeriodAndLength			OPTIONAL
}

CommonTimeslotInfoSCCPCH ::=		SEQUENCE {
	-- TABULAR: The IE below is MD, but since it can be encoded in a single
	-- bit it is not defined as OPTIONAL.
	secondInterleavingMode				SecondInterleavingMode,
	tfci-Coding							TFCI-Coding							OPTIONAL,
	puncturingLimit						PuncturingLimit,
	repetitionPeriodLengthAndOffset		RepetitionPeriodLengthAndOffset		OPTIONAL
}

ConstantValue ::=					INTEGER (-35..-10)

CPCH-PersistenceLevels ::=			SEQUENCE {
	cpch-SetID							CPCH-SetID,
	dynamicPersistenceLevelTF-List		DynamicPersistenceLevelTF-List
}

CPCH-PersistenceLevelsList ::=		SEQUENCE (SIZE (1..maxCPCHsets)) OF
										CPCH-PersistenceLevels

CPCH-SetInfo ::=					SEQUENCE {
	cpch-SetID							CPCH-SetID,
	transportFormatSet					TransportFormatSet,
	tfcs								TFCS,
	ap-PreambleScramblingCode			AP-PreambleScramblingCode,
	ap-AICH-ChannelisationCode			AP-AICH-ChannelisationCode,
	cd-PreambleScramblingCode			CD-PreambleScramblingCode,
	cd-CA-ICH-ChannelisationCode		CD-CA-ICH-ChannelisationCode,
	cd-AccessSlotSubchannelList			CD-AccessSlotSubchannelList			OPTIONAL,
	cd-SignatureCodeList				CD-SignatureCodeList				OPTIONAL,
	deltaPp-m							DeltaPp-m,
	ul-DPCCH-SlotFormat					UL-DPCCH-SlotFormat,
	n-StartMessage						N-StartMessage,
	n-EOT								N-EOT,
	channelAssignmentActive				ChannelAssignmentActive,
	-- TABULAR: VCAM info has been nested inside ChannelAssignmentActive,
	-- which in turn is mandatory since it's only a binary choice.
	cpch-StatusIndicationMode			CPCH-StatusIndicationMode,
	pcpch-ChannelInfoList				PCPCH-ChannelInfoList
}

CPCH-SetInfoList ::=				SEQUENCE (SIZE (1..maxCPCHsets)) OF
										CPCH-SetInfo

CPCH-StatusIndicationMode ::=		ENUMERATED {
										pa-mode,
										pamsf-mode }

CSICH-PowerOffset ::=				INTEGER (-10..5)

-- DefaultDPCH-OffsetValueFDD and DefaultDPCH-OffsetValueTDD corresponds to
-- IE "Default DPCH Offset Value" depending on the mode.
```

```
-- Actual value = IE value * 512
DefaultDPCH-OffsetValueFDD ::=      INTEGER (0..599)

DefaultDPCH-OffsetValueTDD ::=      INTEGER (0..7)

DeltaPp-m ::=                       INTEGER (-10..10)

-- Actual value = IE value * 0.1
DeltaSIR ::=                        INTEGER (0..30)

DL-CCTrCh ::=                       SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    timeInfo                            TimeInfo,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    dl-CCTrCH-TimeslotsCodes            DownlinkTimeslotsCodes              OPTIONAL,
    ul-CCTrChTPCList                    UL-CCTrChTPCList                    OPTIONAL
}

DL-CCTrCh-r4 ::=                    SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    timeInfo                            TimeInfo,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    tddOption                           CHOICE {
        tdd384                              SEQUENCE {
            dl-CCTrCH-TimeslotsCodes            DownlinkTimeslotsCodes  OPTIONAL
        },
        tdd128                              SEQUENCE {
            dl-CCTrCH-TimeslotsCodes            DownlinkTimeslotsCodes-LCR-r4   OPTIONAL
        }
    },
    ul-CCTrChTPCList                    UL-CCTrChTPCList        OPTIONAL
}

DL-CCTrChList ::=                   SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        DL-CCTrCh

DL-CCTrChList-r4 ::=                SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        DL-CCTrCh-r4

DL-CCTrChTPCList ::=                SEQUENCE (SIZE (0..maxCCTrCH)) OF
                                            TFCS-Identity

DL-ChannelisationCode ::=           SEQUENCE {
    secondaryScramblingCode             SecondaryScramblingCode             OPTIONAL,
    sf-AndCodeNumber                    SF512-AndCodeNumber,
    scramblingCodeChange                ScramblingCodeChange                OPTIONAL
}

DL-ChannelisationCodeList ::=       SEQUENCE (SIZE (1..maxDPCH-DLchan)) OF
                                        DL-ChannelisationCode

DL-CommonInformation ::=            SEQUENCE {
    dl-DPCH-InfoCommon                  DL-DPCH-InfoCommon          OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            defaultDPCH-OffsetValue             DefaultDPCH-OffsetValueFDD  OPTIONAL,
            dpch-CompressedModeInfo             DPCH-CompressedModeInfo     OPTIONAL,
            tx-DiversityMode                    TX-DiversityMode            OPTIONAL,
            ssdt-Information                    SSDT-Information            OPTIONAL
        },
        tdd                                 SEQUENCE {
            defaultDPCH-OffsetValue             DefaultDPCH-OffsetValueTDD  OPTIONAL
        }
    }
}

DL-CommonInformation-r4 ::=         SEQUENCE {
    dl-DPCH-InfoCommon                  DL-DPCH-InfoCommon          OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            defaultDPCH-OffsetValue             DefaultDPCH-OffsetValueFDD  OPTIONAL,
            dpch-CompressedModeInfo             DPCH-CompressedModeInfo     OPTIONAL,
            tx-DiversityMode                    TX-DiversityMode            OPTIONAL,
            ssdt-Information                    SSDT-Information-r4         OPTIONAL
        },
        tdd                                 SEQUENCE {
            tddOption                           CHOICE {
                tdd384                              NULL,
```

```
				tdd128						SEQUENCE {
					tstd-Indicator					BOOLEAN
				}
			},
			defaultDPCH-OffsetValue			DefaultDPCH-OffsetValueTDD	OPTIONAL
		}
	}
}

DL-CommonInformationPost ::=		SEQUENCE {
	dl-DPCH-InfoCommon					DL-DPCH-InfoCommonPost
}

DL-CommonInformationPredef ::=		SEQUENCE {
	dl-DPCH-InfoCommon					DL-DPCH-InfoCommonPredef	OPTIONAL
}

DL-CompressedModeMethod ::=			ENUMERATED {
										puncturing, sf-2,
										higherLayerScheduling }

DL-DPCH-InfoCommon ::=				SEQUENCE {
	cfnHandling							CHOICE {
		maintain							NULL,
		initialise							SEQUENCE {
			cfntargetsfnframeoffset				Cfntargetsfnframeoffset			OPTIONAL
		}
	},
	modeSpecificInfo					CHOICE {
		fdd									SEQUENCE {
			dl-DPCH-PowerControlInfo			DL-DPCH-PowerControlInfo			OPTIONAL,
			powerOffsetPilot-pdpdch				PowerOffsetPilot-pdpdch,
			dl-rate-matching-restriction		Dl-rate-matching-restriction		OPTIONAL,
			spreadingFactorAndPilot				SF512-AndPilot,
	-- TABULAR: The number of pilot bits is nested inside the spreading factor.
			positionFixedOrFlexible				PositionFixedOrFlexible,
			tfci-Existence						BOOLEAN
		},
		tdd									SEQUENCE {
			dl-DPCH-PowerControlInfo			DL-DPCH-PowerControlInfo			OPTIONAL
		}
	}
}

DL-DPCH-InfoCommonPost ::=			SEQUENCE {
	dl-DPCH-PowerControlInfo			DL-DPCH-PowerControlInfo				OPTIONAL
}

DL-DPCH-InfoCommonPredef ::=		SEQUENCE {
	modeSpecificInfo					CHOICE {
		fdd									SEQUENCE {
			spreadingFactorAndPilot				SF512-AndPilot,
	-- TABULAR: The number of pilot bits is nested inside the spreading factor.
			positionFixedOrFlexible				PositionFixedOrFlexible,
			tfci-Existence						BOOLEAN
		},
		tdd									SEQUENCE {
			commonTimeslotInfo					CommonTimeslotInfo
		}
	}
}

DL-DPCH-InfoPerRL ::=				CHOICE {
	fdd									SEQUENCE {
		pCPICH-UsageForChannelEst			PCPICH-UsageForChannelEst,
		dpch-FrameOffset					DPCH-FrameOffset,
		secondaryCPICH-Info					SecondaryCPICH-Info				OPTIONAL,
		dl-ChannelisationCodeList			DL-ChannelisationCodeList,
		tpc-CombinationIndex				TPC-CombinationIndex,
		ssdt-CellIdentity					SSDT-CellIdentity				OPTIONAL,
		closedLoopTimingAdjMode				ClosedLoopTimingAdjMode			OPTIONAL
	},
	tdd									DL-CCTrChList
}

DL-DPCH-InfoPerRL-r4 ::=			CHOICE {
	fdd									SEQUENCE {
		pCPICH-UsageForChannelEst			PCPICH-UsageForChannelEst,
```

```
        dpch-FrameOffset                    DPCH-FrameOffset,
        secondaryCPICH-Info                 SecondaryCPICH-Info             OPTIONAL,
        dl-ChannelisationCodeList           DL-ChannelisationCodeList,
        tpc-CombinationIndex                TPC-CombinationIndex,
        ssdt-CellIdentity                   SSDT-CellIdentity               OPTIONAL,
        closedLoopTimingAdjMode             ClosedLoopTimingAdjMode         OPTIONAL
    },
    tdd                                 DL-CCTrChList-r4
}

DL-DPCH-InfoPerRL-PostFDD ::=                               SEQUENCE {
        pCPICH-UsageForChannelEst               PCPICH-UsageForChannelEst,
        dl-ChannelisationCode                   DL-ChannelisationCode,
        tpc-CombinationIndex                    TPC-CombinationIndex
}

DL-DPCH-InfoPerRL-PostTDD ::=               SEQUENCE {
    dl-DPCH-TimeslotsCodes                      DownlinkTimeslotsCodes
}

DL-DPCH-InfoPerRL-PostTDD-LCR-r4 ::=        SEQUENCE {
    dl-CCTrCH-TimeslotsCodes                    DownlinkTimeslotsCodes-LCR-r4
}

DL-DPCH-PowerControlInfo ::=            SEQUENCE {
    modeSpecificInfo                        CHOICE {
        fdd                                     SEQUENCE {
            dpc-Mode                                DPC-Mode
        },
        tdd                                     SEQUENCE {
            tpc-StepSizeTDD                         TPC-StepSizeTDD         OPTIONAL
        }
    }
}

DL-FrameType ::=                    ENUMERATED {
                                        dl-FrameTypeA, dl-FrameTypeB }

DL-InformationPerRL ::=             SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info,
            pdsch-SHO-DCH-Info                  PDSCH-SHO-DCH-Info          OPTIONAL,
            pdsch-CodeMapping                   PDSCH-CodeMapping           OPTIONAL
        },
        tdd                                 PrimaryCCPCH-Info
    },
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL                   OPTIONAL,
    sccpch-InfoforFACH                  SCCPCH-InfoForFACH                  OPTIONAL
}

DL-InformationPerRL-r4 ::=          SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info,
            pdsch-SHO-DCH-Info                  PDSCH-SHO-DCH-Info          OPTIONAL,
            pdsch-CodeMapping                   PDSCH-CodeMapping           OPTIONAL
        },
        tdd                                 PrimaryCCPCH-Info-r4
    },
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL-r4                OPTIONAL,
    secondaryCCPCH-Info                 SecondaryCCPCH-Info-r4              OPTIONAL
}

DL-InformationPerRL-List ::=        SEQUENCE (SIZE (1..maxRL)) OF
                                        DL-InformationPerRL

DL-InformationPerRL-List-r4 ::=     SEQUENCE (SIZE (1..maxRL)) OF
                                        DL-InformationPerRL-r4

DL-InformationPerRL-ListPostFDD ::= SEQUENCE (SIZE (1..maxRL)) OF
                                        DL-InformationPerRL-PostFDD

DL-InformationPerRL-PostFDD ::=     SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info,
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL-PostFDD
}
```

```
DL-InformationPerRL-PostTDD ::=     SEQUENCE {
    primaryCCPCH-Info                   PrimaryCCPCH-InfoPost,
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL-PostTDD
}

DL-InformationPerRL-PostTDD-LCR-r4 ::=  SEQUENCE {
    primaryCCPCH-Info                   PrimaryCCPCH-InfoPostTDD-LCR-r4,
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL-PostTDD-LCR-r4
}

DL-PDSCH-Information ::=            SEQUENCE {
    pdsch-SHO-DCH-Info                  PDSCH-SHO-DCH-Info                  OPTIONAL,
    pdsch-CodeMapping                   PDSCH-CodeMapping                   OPTIONAL
}

Dl-rate-matching-restriction ::=    SEQUENCE {
    restrictedTrCH-InfoList             RestrictedTrCH-InfoList             OPTIONAL
}

DL-TS-ChannelisationCode ::=        ENUMERATED {
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

DL-TS-ChannelisationCodesShort ::=  SEQUENCE {
    codesRepresentation                 CHOICE {
        consecutive                         SEQUENCE {
            firstChannelisationCode             DL-TS-ChannelisationCode,
            lastChannelisationCode              DL-TS-ChannelisationCode
        },
        bitmap                              BIT STRING {
                                                chCode16-SF16(0),
                                                chCode15-SF16(1),
                                                chCode14-SF16(2),
                                                chCode13-SF16(3),
                                                chCode12-SF16(4),
                                                chCode11-SF16(5),
                                                chCode10-SF16(6),
                                                chCode9-SF16(7),
                                                chCode8-SF16(8),
                                                chCode7-SF16(9),
                                                chCode6-SF16(10),
                                                chCode5-SF16(11),
                                                chCode4-SF16(12),
                                                chCode3-SF16(13),
                                                chCode2-SF16(14),
                                                chCode1-SF16(15)
                                                }   (SIZE (16))
    }
}

DownlinkAdditionalTimeslots ::=     SEQUENCE {
    parameters                          CHOICE {
        sameAsLast                          SEQUENCE {
            timeslotNumber                      TimeslotNumber
        },
        newParameters                       SEQUENCE {
            individualTimeslotInfo              IndividualTimeslotInfo,
            dl-TS-ChannelisationCodesShort      DL-TS-ChannelisationCodesShort
        }
    }
}

DownlinkAdditionalTimeslots-LCR-r4 ::=  SEQUENCE {
    parameters                          CHOICE {
        sameAsLast                          SEQUENCE {
            timeslotNumber                      TimeslotNumber-LCR-r4
        },
        newParameters                       SEQUENCE {
            individualTimeslotInfo              IndividualTimeslotInfo-LCR-r4,
            dl-TS-ChannelisationCodesShort      DL-TS-ChannelisationCodesShort
        }
    }
}

DownlinkTimeslotsCodes ::=      SEQUENCE {
    firstIndividualTimeslotInfo         IndividualTimeslotInfo,
```

```
    dl-TS-ChannelisationCodesShort      DL-TS-ChannelisationCodesShort,
    moreTimeslots                       CHOICE {
        noMore                              NULL,
        additionalTimeslots                 CHOICE {
            consecutive                         INTEGER (1..maxTS-1),
            timeslotList                        SEQUENCE (SIZE (1..maxTS-1)) OF
                                                    DownlinkAdditionalTimeslots
        }
    }
}

DownlinkTimeslotsCodes-LCR-r4 ::=   SEQUENCE {
    firstIndividualTimeslotInfo         IndividualTimeslotInfo-LCR-r4,
    dl-TS-ChannelisationCodesShort      DL-TS-ChannelisationCodesShort,
    moreTimeslots                       CHOICE {
        noMore                              NULL,
        additionalTimeslots                 CHOICE {
            consecutive                         INTEGER (1..maxTS-LCR-1),
            timeslotList                        SEQUENCE (SIZE (1..maxTS-LCR-1)) OF
                                                    DownlinkAdditionalTimeslots-LCR-r4
        }
    }
}

DPC-Mode ::=                        ENUMERATED {
                                        singleTPC,
                                        tpcTripletInSoft }

-- The actual value of DPCCH power offset is the value of this IE * 2.
DPCCH-PowerOffset ::=               INTEGER (-82..-3)


-- The actual value of DPCCH power offset is the value of this (2 + IE * 4).
DPCCH-PowerOffset2 ::=              INTEGER (-28..-13)

DPCH-CompressedModeInfo ::=         SEQUENCE {
    tgp-SequenceList                    TGP-SequenceList
}

DPCH-CompressedModeStatusInfo ::=   SEQUENCE {
    tgps-Reconfiguration-CFN            TGPS-Reconfiguration-CFN,
    tgp-SequenceShortList                   SEQUENCE (SIZE (1..maxTGPS)) OF
                                            TGP-SequenceShort
}

-- TABULAR: Actual value = IE value * 256
DPCH-FrameOffset::=                 INTEGER (0..149)

DSCH-Mapping ::=                    SEQUENCE {
    maxTFCI-Field2Value                 MaxTFCI-Field2Value,
    spreadingFactor                     SF-PDSCH,
    codeNumber                          CodeNumberDSCH,
    multiCodeInfo                       MultiCodeInfo
}

DSCH-MappingList ::=                SEQUENCE (SIZE (1..maxPDSCH-TFCIgroups)) OF
                                        DSCH-Mapping

DSCH-RadioLinkIdentifier ::=        INTEGER (0..511)

DurationTimeInfo ::=                INTEGER (1..4096)

-- TABULAR : value [Duration = infinite] is the value by default,
-- and is encoded by absence of the full sequence. If the sequence is present,
-- thefield is absent, the default is respectivelyinfinite. Presence of the
-- field absent should not be used, but shall be understood as if the
-- sequence was absent.

DynamicPersistenceLevel ::=         INTEGER (1..8)

DynamicPersistenceLevelList ::=     SEQUENCE (SIZE (1..maxPRACH)) OF
                                        DynamicPersistenceLevel

DynamicPersistenceLevelTF-List ::= SEQUENCE (SIZE (1..maxTF-CPCH)) OF
                                        DynamicPersistenceLevel

FACH-PCH-Information ::=            SEQUENCE {
    transportFormatSet                  TransportFormatSet,
```

```
    transportChannelIdentity            TransportChannelIdentity,
    ctch-Indicator                      BOOLEAN
}

FACH-PCH-InformationList ::=        SEQUENCE (SIZE (1..maxFACHPCH)) OF
                                        FACH-PCH-Information

FPACH-Info-r4 ::=                       SEQUENCE {
    timeslot                            TimeslotNumber-LCR-r4,
    channelisationCode                  TDD-FPACH-CCode16-r4,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    wi                                  Wi-LCR
}

FrequencyInfo ::=                   SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 FrequencyInfoFDD,
        tdd                                 FrequencyInfoTDD    }
}

FrequencyInfoFDD ::=                SEQUENCE {
    uarfcn-UL                           UARFCN              OPTIONAL,
    uarfcn-DL                           UARFCN
}

FrequencyInfoTDD ::=                SEQUENCE {
    uarfcn-Nt                           UARFCN
}

IndividualTimeslotInfo ::=          SEQUENCE {
    timeslotNumber                      TimeslotNumber,
    tfci-Existence                      BOOLEAN,
    midambleShiftAndBurstType           MidambleShiftAndBurstType
}

IndividualTimeslotInfo-LCR-r4 ::=   SEQUENCE {
    timeslotNumber                      TimeslotNumber-LCR-r4,
    tfci-Existence                      BOOLEAN,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF }
}

IndividualTimeslotInfo-LCR-r4-ext ::=       SEQUENCE {
-- timeslotNumber and tfci-Existence is taken from IndividualTimeslotInfo.
-- midambleShiftAndBurstType in IndividualTimeslotInfo shall be ignored.
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF }
}

IndividualTS-Interference ::=       SEQUENCE {
    timeslot                            TimeslotNumber,
    ul-TimeslotInterference             UL-Interference
}

IndividualTS-Interference-LCR-r4 ::=        SEQUENCE {
    timeslot                            TimeslotNumber-LCR-r4,
    ul-TimeslotInterference             UL-Interference
}

IndividualTS-InterferenceList ::=   SEQUENCE (SIZE (1..maxTS)) OF
                                        IndividualTS-Interference

IndividualTS-InterferenceList-r4 ::=    CHOICE {
    tdd384                                  SEQUENCE (SIZE (1..maxTS)) OF
                                                IndividualTS-Interference,
    tdd128                                  SEQUENCE (SIZE (1..maxTS-LCR)) OF
                                                IndividualTS-Interference-LCR-r4
}

ITP ::=                             ENUMERATED {
                                        mode0, mode1 }

NidentifyAbort ::=  INTEGER (1..128)

MaxAllowedUL-TX-Power ::=           INTEGER (-50..33)
```

```
MaxAvailablePCPCH-Number ::=        INTEGER (1..64)

MaxPowerIncrease-r4 ::=             INTEGER (0..3)

MaxTFCI-Field2Value ::=             INTEGER (1..1023)

MidambleConfigurationBurstType1and3 ::= ENUMERATED {ms4, ms8, ms16}

MidambleConfigurationBurstType2 ::=     ENUMERATED {ms3, ms6}

MidambleShiftAndBurstType ::=       SEQUENCE {
    burstType                           CHOICE {
        type1                               SEQUENCE {
            midambleConfigurationBurstType1and3 MidambleConfigurationBurstType1and3,
            midambleAllocationMode              CHOICE {
                defaultMidamble                     NULL,
                commonMidamble                      NULL,
                ueSpecificMidamble                  SEQUENCE {
                    midambleShift                       MidambleShiftLong
                }
            }
        },
        type2                               SEQUENCE {
            midambleConfigurationBurstType2     MidambleConfigurationBurstType2,
            midambleAllocationMode              CHOICE {
                defaultMidamble                     NULL,
                commonMidamble                      NULL,
                ueSpecificMidamble                  SEQUENCE {
                    midambleShift                       MidambleShiftShort
                }
            }
        },
        type3                               SEQUENCE {
            midambleConfigurationBurstType1and3 MidambleConfigurationBurstType1and3,
            midambleAllocationMode              CHOICE {
                defaultMidamble                     NULL,
                ueSpecificMidamble                  SEQUENCE {
                    midambleShift                       MidambleShiftLong
                }
            }
        }
    }
}

MidambleShiftAndBurstType-LCR-r4 ::=    SEQUENCE {
    midambleAllocationMode              CHOICE {
        defaultMidamble                     NULL,
        commonMidamble                      NULL,
        ueSpecificMidamble                  SEQUENCE {
            midambleShift                       INTEGER (0..15)
        }
    },
    midambleConfiguration               INTEGER (1..8)   -- Actual value = IE value * 2
}

MidambleShiftLong ::=               INTEGER (0..15)


MidambleShiftShort ::=              INTEGER (0..5)

MinimumSpreadingFactor ::=          ENUMERATED {
                                        sf4, sf8, sf16, sf32,
                                        sf64, sf128, sf256 }

MultiCodeInfo ::=                   INTEGER (1..16)


N-EOT ::=                           INTEGER (0..7)

N-GAP ::=                           ENUMERATED {
                                        f2, f4, f8 }

N-PCH ::=                           INTEGER (1..8)

N-StartMessage ::=                  INTEGER (1..8)

NB01 ::=                            INTEGER (0..50)
```

```
NF-Max ::=                          INTEGER (1..64)

NumberOfDPDCH ::=                   INTEGER (1..maxDPDCH-UL)

NumberOfFBI-Bits ::=                INTEGER (1..2)

OpenLoopPowerControl-TDD ::=        SEQUENCE {
    primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power,
-- The following IEs shall be ignored in 1.28Mcps TDD mode.
    alpha                               Alpha                       OPTIONAL,
    prach-ConstantValue                 ConstantValue,
    dpch-ConstantValue                  ConstantValue,
    pusch-ConstantValue                 ConstantValue               OPTIONAL
}

OpenLoopPowerControl-IPDL-TDD-r4 ::=    SEQUENCE {
    ipdl-alpha                          Alpha,
    maxPowerIncrease                    MaxPowerIncrease-r4
}

PagingIndicatorLength ::=           ENUMERATED {
                                        pi4, pi8, pi16 }

PC-Preamble ::=                     INTEGER (0..7)

PCP-Length ::=                      ENUMERATED {
                                        as0, as8 }

PCPCH-ChannelInfo ::=               SEQUENCE {
    pcpch-UL-ScramblingCode             INTEGER (0..79),
    pcpch-DL-ChannelisationCode         INTEGER (0..511),
    pcpch-DL-ScramblingCode             SecondaryScramblingCode             OPTIONAL,
    pcp-Length                          PCP-Length,
    ucsm-Info                           UCSM-Info                           OPTIONAL
}

PCPCH-ChannelInfoList ::=           SEQUENCE (SIZE (1..maxPCPCHs)) OF
                                        PCPCH-ChannelInfo

PCPICH-UsageForChannelEst ::=       ENUMERATED {
                                        mayBeUsed,
                                        shallNotBeUsed }

PDSCH-CapacityAllocationInfo ::=    SEQUENCE {
    pdsch-PowerControlInfo              PDSCH-PowerControlInfo              OPTIONAL,
    -- pdsch-PowerControlInfo is conditional on new-configuration branch below, if this
    -- selected the IE is OPTIONAL otherwise it should not be sent
    pdsch-AllocationPeriodInfo          AllocationPeriodInfo,
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    configuration                       CHOICE {
        old-Configuration                   SEQUENCE {
            pdsch-Identity                      PDSCH-Identity
        },
        new-Configuration                   SEQUENCE {
            pdsch-Info                          PDSCH-Info,
            pdsch-Identity                      PDSCH-Identity              OPTIONAL
        }
    }
}

PDSCH-CapacityAllocationInfo-r4 ::= SEQUENCE {
    pdsch-PowerControlInfo              PDSCH-PowerControlInfo              OPTIONAL,
    -- pdsch-PowerControlInfo is conditional on new-configuration branch below, if this
    -- selected the IE is OPTIONAL otherwise it should not be sent
    pdsch-AllocationPeriodInfo          AllocationPeriodInfo,
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    configuration                       CHOICE {
        old-Configuration                   SEQUENCE {
            pdsch-Identity                      PDSCH-Identity
        },
        new-Configuration                   SEQUENCE {
            pdsch-Info                          PDSCH-Info-r4,
            pdsch-Identity                      PDSCH-Identity              OPTIONAL
        }
    }
}

PDSCH-CodeInfo ::=                  SEQUENCE {
```

```
    spreadingFactor                     SF-PDSCH,
    codeNumber                          CodeNumberDSCH,
    multiCodeInfo                       MultiCodeInfo
}

PDSCH-CodeInfoList ::=              SEQUENCE (SIZE (1..maxTFCI-2-Combs)) OF
                                        PDSCH-CodeInfo

PDSCH-CodeMap ::=                   SEQUENCE {
    spreadingFactor                     SF-PDSCH,
    multiCodeInfo                       MultiCodeInfo,
    codeNumberStart                     CodeNumberDSCH,
    codeNumberStop                      CodeNumberDSCH
}

PDSCH-CodeMapList ::=               SEQUENCE (SIZE (1..maxPDSCH-TFCIgroups)) OF
                                        PDSCH-CodeMap

PDSCH-CodeMapping ::=               SEQUENCE {
    dl-ScramblingCode                   SecondaryScramblingCode             OPTIONAL,
    signallingMethod                    CHOICE {
        codeRange                           CodeRange,
        tfci-Range                          DSCH-MappingList,
        explicit-config                     PDSCH-CodeInfoList,
        replace                             ReplacedPDSCH-CodeInfoList
    }
}

PDSCH-Identity ::=                  INTEGER (1..hiPDSCHidentities)


PDSCH-Info ::=                      SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    pdsch-TimeslotsCodes                DownlinkTimeslotsCodes              OPTIONAL
}

PDSCH-Info-r4 ::=                       SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    tddOption                           CHOICE {
        tdd384                              SEQUENCE {
            pdsch-TimeslotsCodes                DownlinkTimeslotsCodes      OPTIONAL
        },
        tdd128                              SEQUENCE {
            pdsch-TimeslotsCodes                DownlinkTimeslotsCodes-LCR-r4   OPTIONAL
        }
    }
}

PDSCH-Info-LCR-r4 ::=               SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    pdsch-TimeslotsCodes                DownlinkTimeslotsCodes-LCR-r4       OPTIONAL
}

PDSCH-PowerControlInfo ::=          SEQUENCE {
    tpc-StepSizeTDD                     TPC-StepSizeTDD                     OPTIONAL,
    ul-CCTrChTPCList                    UL-CCTrChTPCList                    OPTIONAL
}

PDSCH-SHO-DCH-Info ::=              SEQUENCE {
    dsch-RadioLinkIdentifier            DSCH-RadioLinkIdentifier,
    rl-IdentifierList                   RL-IdentifierList                   OPTIONAL
}

PDSCH-SysInfo ::=                   SEQUENCE {
    pdsch-Identity                      PDSCH-Identity,
    pdsch-Info                          PDSCH-Info,
    dsch-TFS                            TransportFormatSet                  OPTIONAL,
    dsch-TFCS                           TFCS                                OPTIONAL
}

PDSCH-SysInfo-LCR-r4 ::=            SEQUENCE {
    pdsch-Identity                      PDSCH-Identity,
    pdsch-Info                          PDSCH-Info-LCR-r4,
    dsch-TFS                            TransportFormatSet                  OPTIONAL,
    dsch-TFCS                           TFCS                                OPTIONAL
```

```
}

PDSCH-SysInfoList ::=               SEQUENCE (SIZE (1..maxPDSCH)) OF
                                        PDSCH-SysInfo

PDSCH-SysInfoList-LCR-r4 ::=        SEQUENCE (SIZE (1..maxPDSCH)) OF
                                        PDSCH-SysInfo-LCR-r4

PDSCH-SysInfoList-SFN ::=           SEQUENCE (SIZE (1..maxPDSCH)) OF
                                        SEQUENCE {
    pdsch-SysInfo                           PDSCH-SysInfo,
    sfn-TimeInfo                            SFN-TimeInfo                    OPTIONAL
}

PDSCH-SysInfoList-SFN-LCR-r4 ::=    SEQUENCE (SIZE (1..maxPDSCH)) OF
                                        SEQUENCE {
    pdsch-SysInfo                           PDSCH-SysInfo-LCR-r4,
    sfn-TimeInfo                            SFN-TimeInfo                    OPTIONAL
}

PersistenceScalingFactor ::=        ENUMERATED {
                                        psf0-9, psf0-8, psf0-7, psf0-6,
                                        psf0-5, psf0-4, psf0-3, psf0-2 }

PersistenceScalingFactorList ::=    SEQUENCE (SIZE (1..maxASCpersist)) OF
                                        PersistenceScalingFactor

PI-CountPerFrame ::=                ENUMERATED {
                                        e18, e36, e72, e144 }

PichChannelisationCodeList-LCR-r4   ::=           SEQUENCE (SIZE (1..2)) OF
                                                     DL-TS-ChannelisationCode

PICH-Info ::=                       CHOICE {
    fdd                                 SEQUENCE {
        channelisationCode256               ChannelisationCode256,
        pi-CountPerFrame                    PI-CountPerFrame,
        sttd-Indicator                      BOOLEAN
    },
    tdd                                 SEQUENCE {
        channelisationCode                  TDD-PICH-CCode                  OPTIONAL,
        timeslot                            TimeslotNumber                  OPTIONAL,
        midambleShiftAndBurstType           MidambleShiftAndBurstType,
        repetitionPeriodLengthOffset        RepPerLengthOffset-PICH         OPTIONAL,
        pagingIndicatorLength               PagingIndicatorLength           DEFAULT pi4,
        n-GAP                               N-GAP                           DEFAULT f4,
        n-PCH                               N-PCH                           DEFAULT 2
    }
}

PICH-Info-LCR-r4 ::=                SEQUENCE {
    timeslot                            TimeslotNumber-LCR-r4               OPTIONAL,
    pichChannelisationCodeList-LCR-r4   PichChannelisationCodeList-LCR-r4,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    repetitionPeriodLengthOffset        RepPerLengthOffset-PICH             OPTIONAL,
    pagingIndicatorLength               PagingIndicatorLength           DEFAULT pi4,
    n-GAP                               N-GAP                           DEFAULT f4,
    n-PCH                               N-PCH                           DEFAULT 2
}

PICH-PowerOffset ::=                INTEGER (-10..5)

PilotBits128 ::=                    ENUMERATED {
                                        pb4, pb8 }

PilotBits256 ::=                    ENUMERATED {
                                        pb2, pb4, pb8 }

PositionFixedOrFlexible ::=         ENUMERATED {
                                        fixed,
                                        flexible }

PowerControlAlgorithm ::=           CHOICE {
    algorithm1                          TPC-StepSizeFDD,
    algorithm2                          NULL
}

PowerOffsetPilot-pdpdch ::=         INTEGER (0..24)
```

```
PowerRampStep ::=                   INTEGER (1..8)

PRACH-ChanCodes-LCR-r4 ::=          SEQUENCE (SIZE (1..4)) OF
                                        TDD-PRACH-CCode-LCR-r4

PRACH-Definition-LCR-r4 ::=         SEQUENCE {
    timeslot                            TimeslotNumber-PRACH-LCR-r4,
    prach-ChanCodes-LCR                 PRACH-ChanCodes-LCR-r4,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    fpach-Info                          FPACH-Info-r4
}

PRACH-Midamble ::=                  ENUMERATED {
                                        direct,
                                        direct-Inverted }

PRACH-Partitioning ::=              CHOICE {
    fdd                                 SEQUENCE (SIZE (1..maxASC)) OF
                                            ASCSetting-FDD,
    tdd                                 SEQUENCE (SIZE (1..maxASC)) OF
                                            ASCSetting-TDD
}

PRACH-Partitioning-LCR-r4 ::=       SEQUENCE (SIZE (1..maxASC)) OF
                                            ASCSetting-TDD-LCR-r4

PRACH-PowerOffset ::=               SEQUENCE {
    powerRampStep                       PowerRampStep,
    preambleRetransMax                  PreambleRetransMax
}

PRACH-RACH-Info ::=                 SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            availableSignatures                 AvailableSignatures,
            availableSF                         SF-PRACH,
            preambleScramblingCodeWordNumber    PreambleScramblingCodeWordNumber,
            puncturingLimit                     PuncturingLimit,
            availableSubChannelNumbers          AvailableSubChannelNumbers
        },
        tdd                                 SEQUENCE {
            timeslot                            TimeslotNumber,
            channelisationCodeList              TDD-PRACH-CCodeList,
            prach-Midamble                      PRACH-Midamble
        }
    }
}

PRACH-RACH-Info-LCR-r4 ::=          SEQUENCE {
    sync-UL-Info                        SYNC-UL-Info-r4,
    prach-DefinitionList                SEQUENCE (SIZE (1..maxPRACH-FPACH)) OF
                                            PRACH-Definition-LCR-r4
}

PRACH-SystemInformation ::=         SEQUENCE {
    prach-RACH-Info                     PRACH-RACH-Info,
    transportChannelIdentity            TransportChannelIdentity,
    rach-TransportFormatSet             TransportFormatSet                  OPTIONAL,
    rach-TFCS                           TFCS                                OPTIONAL,
    prach-Partitioning                  PRACH-Partitioning                  OPTIONAL,
    persistenceScalingFactorList        PersistenceScalingFactorList        OPTIONAL,
    ac-To-ASC-MappingTable              AC-To-ASC-MappingTable              OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            constantValue                       ConstantValue               OPTIONAL,
            prach-PowerOffset                   PRACH-PowerOffset           OPTIONAL,
            rach-TransmissionParameters         RACH-TransmissionParameters OPTIONAL,
            aich-Info                           AICH-Info                   OPTIONAL
        },
        tdd                                 NULL
    }
}

PRACH-SystemInformation-LCR-r4 ::=  SEQUENCE {
    prach-RACH-Info-LCR                 PRACH-RACH-Info-LCR-r4,
    rach-TransportFormatSet-LCR         TransportFormatSet-LCR          OPTIONAL,
```

```
    prach-Partitioning-LCR              PRACH-Partitioning-LCR-r4       OPTIONAL
}

PRACH-SystemInformationList ::=     SEQUENCE (SIZE (1..maxPRACH)) OF
                                        PRACH-SystemInformation

PRACH-SystemInformationList-LCR-r4 ::=  SEQUENCE (SIZE (1..maxPRACH)) OF
                                            PRACH-SystemInformation-LCR-r4

PreambleRetransMax ::=              INTEGER (1..64)

PreambleScramblingCodeWordNumber ::=    INTEGER (0..15)

PreDefPhyChConfiguration ::=        SEQUENCE {
    ul-DPCH-InfoPredef                  UL-DPCH-InfoPredef,
    dl-CommonInformationPredef          DL-CommonInformationPredef  OPTIONAL
}

PrimaryCCPCH-Info ::=               CHOICE {
    fdd                                 SEQUENCE {
        tx-DiversityIndicator               BOOLEAN
    },
    tdd                                 SEQUENCE {
        -- syncCase should be absent for 1.28Mcps TDD mode
        syncCase                            CHOICE {
            syncCase1                           SEQUENCE {
                timeslot                            TimeslotNumber
            },
            syncCase2                           SEQUENCE {
                timeslotSync2                       TimeslotSync2
            }
        }                                                                   OPTIONAL,
        cellParametersID                    CellParametersID                OPTIONAL,
        sctd-Indicator                      BOOLEAN
    }
}

PrimaryCCPCH-Info-r4 ::=            CHOICE {
    fdd                                 SEQUENCE {
        tx-DiversityIndicator               BOOLEAN
    },
    tdd                                 SEQUENCE {
        tddOption                           CHOICE {
            tdd384                              SEQUENCE {
                syncCase                            CHOICE {
                    syncCase1                           SEQUENCE {
                        timeslot                            TimeslotNumber
                    },
                    syncCase2                           SEQUENCE {
                        timeslotSync2                       TimeslotSync2
                    }
                }                                                           OPTIONAL
            },
            tdd128                              SEQUENCE {
                tstd-Indicator                      BOOLEAN
            }
        },
        cellParametersID                    CellParametersID                OPTIONAL,
        blockSTTD-Indicator                 BOOLEAN
    }
}

PrimaryCCPCH-Info-LCR-r4 ::=        SEQUENCE {
    tstd-Indicator                      BOOLEAN,
    cellParametersID                    CellParametersID                OPTIONAL,
    blockSTTD-Indicator                 BOOLEAN
}

-- For 1.28Mcps TDD, the following IE includes elements for the PCCPCH Info additional to those
-- in PrimaryCCPCH-Info
PrimaryCCPCH-Info-LCR-r4-ext ::=    SEQUENCE {
    tstd-Indicator                      BOOLEAN
}

PrimaryCCPCH-InfoPost ::=           SEQUENCE {
    syncCase                            CHOICE {
        syncCase1                           SEQUENCE {
            timeslot                            TimeslotNumber
```

```
        },
        syncCase2                           SEQUENCE {
            timeslotSync2                       TimeslotSync2
        }
    },
    cellParametersID                    CellParametersID,
    sctd-Indicator                      BOOLEAN
}

PrimaryCCPCH-InfoPostTDD-LCR-r4 ::= SEQUENCE {
    tstd-Indicator                      BOOLEAN,
    cellParametersID                    CellParametersID,
    blockSTTD-Indicator                 BOOLEAN
}

PrimaryCCPCH-TX-Power ::=           INTEGER (6..43)

PrimaryCPICH-Info ::=               SEQUENCE {
    primaryScramblingCode               PrimaryScramblingCode
}

PrimaryCPICH-TX-Power ::=           INTEGER (-10..50)

PrimaryScramblingCode ::=           INTEGER (0..511)

PuncturingLimit ::=                 ENUMERATED {
                                        pl0-40, pl0-44, pl0-48, pl0-52, pl0-56,
                                        pl0-60, pl0-64, pl0-68, pl0-72, pl0-76,
                                        pl0-80, pl0-84, pl0-88, pl0-92, pl0-96, pl1 }

PUSCH-CapacityAllocationInfo ::=    SEQUENCE {
    pusch-Allocation                    CHOICE {
        pusch-AllocationPending             NULL,
        pusch-AllocationAssignment          SEQUENCE {
            pusch-AllocationPeriodInfo          AllocationPeriodInfo,
            pusch-PowerControlInfo              UL-TargetSIR                OPTIONAL,
            tfcs-ID                             TFCS-IdentityPlain          DEFAULT 1,
            configuration                       CHOICE {
                old-Configuration                   SEQUENCE {
                    pusch-Identity                      PUSCH-Identity
                },
                new-Configuration                   SEQUENCE {
                    pusch-Info                          PUSCH-Info,
                    pusch-Identity                      PUSCH-Identity      OPTIONAL
                }
            }
        }
    }
}

PUSCH-CapacityAllocationInfo-r4 ::= SEQUENCE {
    pusch-Allocation                    CHOICE {
        pusch-AllocationPending             NULL,
        pusch-AllocationAssignment          SEQUENCE {
            pusch-AllocationPeriodInfo          AllocationPeriodInfo,
            pusch-PowerControlInfo              PUSCH-PowerControlInfo-r4   OPTIONAL,
            tfcs-Identity                       TFCS-IdentityPlain          OPTIONAL,
            configuration                       CHOICE {
                old-Configuration                   SEQUENCE {
                    pusch-Identity                      PUSCH-Identity
                },
                new-Configuration                   SEQUENCE {
                    pusch-Info                          PUSCH-Info-r4,
                    pusch-Identity                      PUSCH-Identity      OPTIONAL
                }
            }
        }
    }
}

PUSCH-Identity ::=                  INTEGER (1..hiPUSCHidentities)

PUSCH-Info ::=                      SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    pusch-TimeslotsCodes                UplinkTimeslotsCodes                OPTIONAL
}
```

```
PUSCH-Info-r4 ::=                   SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    tddOption                           CHOICE {
        tdd384                              SEQUENCE {
            pusch-TimeslotsCodes                UplinkTimeslotsCodes        OPTIONAL
        },
        tdd128                              SEQUENCE {
            pusch-TimeslotsCodes                UplinkTimeslotsCodes-LCR-r4 OPTIONAL
        }
    }
}

PUSCH-Info-LCR-r4 ::=               SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,

    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    pusch-TimeslotsCodes                UplinkTimeslotsCodes-LCR-r4         OPTIONAL
}

PUSCH-PowerControlInfo-r4 ::=       SEQUENCE {
    -- The IE ul-TargetSIR corresponds to PRX-PUSCHdes for 1.28Mcps TDD
    -- Actual value PRX-PUSCHdes = (value of IE "ul-TargetSIR" – 120)
    ul-TargetSIR                        UL-TargetSIR,
    tddOption                           CHOICE {
        tdd384                              NULL,
        tdd128                              SEQUENCE {
            tpc-StepSize                        TPC-StepSizeTDD             OPTIONAL,
            dl-CCTrChTPCList                    DL-CCTrChTPCList            OPTIONAL
        }
    }
}

PUSCH-SysInfo ::=                   SEQUENCE {
    pusch-Identity                      PUSCH-Identity,
    pusch-Info                          PUSCH-Info,
    usch-TFS                            TransportFormatSet                  OPTIONAL,
    usch-TFCS                           TFCS                                OPTIONAL
}

PUSCH-SysInfo-LCR-r4 ::=            SEQUENCE {
    pusch-Identity                      PUSCH-Identity,
    pusch-Info                          PUSCH-Info-LCR-r4,
    usch-TFS                            TransportFormatSet                  OPTIONAL,
    usch-TFCS                           TFCS                                OPTIONAL
}

PUSCH-SysInfoList ::=               SEQUENCE (SIZE (1..maxPUSCH)) OF
                                        PUSCH-SysInfo

PUSCH-SysInfoList-LCR-r4 ::=        SEQUENCE (SIZE (1..maxPUSCH)) OF
                                        PUSCH-SysInfo-LCR-r4

PUSCH-SysInfoList-SFN ::=           SEQUENCE (SIZE (1..maxPUSCH)) OF
                                        SEQUENCE {
    pusch-SysInfo                           PUSCH-SysInfo,
    sfn-TimeInfo                            SFN-TimeInfo                    OPTIONAL
}

PUSCH-SysInfoList-SFN-LCR-r4 ::=        SEQUENCE (SIZE (1..maxPUSCH)) OF
                                        SEQUENCE {
    pusch-SysInfo                           PUSCH-SysInfo-LCR-r4,
    sfn-TimeInfo                            SFN-TimeInfo                    OPTIONAL
}

RACH-TransmissionParameters ::=     SEQUENCE {
    mmax                                INTEGER (1..32),
    nb01Min                             NB01,
    nb01Max                             NB01
}

ReducedScramblingCodeNumber ::=     INTEGER (0..8191)

RepetitionPeriodAndLength ::=       CHOICE {
    repetitionPeriod1                   NULL,
    repetitionPeriod2                   INTEGER (1..1),
    -- repetitionPeriod2 could just as well be NULL also.
    repetitionPeriod4                   INTEGER (1..3),
```

```
    repetitionPeriod8                   INTEGER (1..7),
    repetitionPeriod16                  INTEGER (1..15),
    repetitionPeriod32                  INTEGER (1..31),
    repetitionPeriod64                  INTEGER (1..63)
}

RepetitionPeriodLengthAndOffset ::= CHOICE {
    repetitionPeriod1                   NULL,
    repetitionPeriod2                   SEQUENCE {
        length                              NULL,
        offset                              INTEGER (0..1)
    },
    repetitionPeriod4                   SEQUENCE {
        length                              INTEGER (1..3),
        offset                              INTEGER (0..3)
    },
    repetitionPeriod8                   SEQUENCE {
        length                              INTEGER (1..7),
        offset                              INTEGER (0..7)
    },
    repetitionPeriod16                  SEQUENCE {
        length                              INTEGER (1..15),
        offset                              INTEGER (0..15)
    },
    repetitionPeriod32                  SEQUENCE {
        length                              INTEGER (1..31),
        offset                              INTEGER (0..31)
    },
    repetitionPeriod64                  SEQUENCE {
        length                              INTEGER (1..63),
        offset                              INTEGER (0..63)
    }
}

ReplacedPDSCH-CodeInfo ::=          SEQUENCE {
    tfci-Field2                         MaxTFCI-Field2Value,
    spreadingFactor                     SF-PDSCH,
    codeNumber                          CodeNumberDSCH,
    multiCodeInfo                       MultiCodeInfo
}

ReplacedPDSCH-CodeInfoList ::=      SEQUENCE (SIZE (1..maxTFCI-2-Combs)) OF
                                        ReplacedPDSCH-CodeInfo

RepPerLengthOffset-PICH ::=         CHOICE {
    rpp4-2                              INTEGER (0..3),
    rpp8-2                              INTEGER (0..7),
    rpp8-4                              INTEGER (0..7),
    rpp16-2                             INTEGER (0..15),
    rpp16-4                             INTEGER (0..15),
    rpp32-2                             INTEGER (0..31),
    rpp32-4                             INTEGER (0..31),
    rpp64-2                             INTEGER (0..63),
    rpp64-4                             INTEGER (0..63)
}

RestrictedTrCH ::=                  SEQUENCE {
    dl-restrictedTrCh-Type              DL-TrCH-Type,
    restrictedDL-TrCH-Identity          TransportChannelIdentity,
    allowedTFIList                      AllowedTFI-List
}

RestrictedTrCH-InfoList ::=         SEQUENCE (SIZE(1..maxTrCH)) OF
                                        RestrictedTrCH

RL-AdditionInformation ::=          SEQUENCE {
    primaryCPICH-Info                   PrimaryCPICH-Info,
    dl-DPCH-InfoPerRL                   DL-DPCH-InfoPerRL,
    tfci-CombiningIndicator             BOOLEAN,
    sccpch-InfoforFACH                  SCCPCH-InfoForFACH                  OPTIONAL
}

RL-AdditionInformationList ::=      SEQUENCE (SIZE (1..maxRL-1)) OF
                                        RL-AdditionInformation

RL-IdentifierList ::=               SEQUENCE (SIZE (1..maxRL)) OF
                                        PrimaryCPICH-Info
```

```
RL-RemovalInformationList ::=       SEQUENCE (SIZE (1..maxRL)) OF
                                        PrimaryCPICH-Info

RPP ::=                             ENUMERATED {
                                        mode0, mode1 }

S-Field ::=                         ENUMERATED {
                                        e1bit, e2bits }

SCCPCH-ChannelisationCode ::=       ENUMERATED {
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

SCCPCH-ChannelisationCodeList ::=   SEQUENCE (SIZE (1..16)) OF
                                        SCCPCH-ChannelisationCode

SCCPCH-InfoForFACH ::=              SEQUENCE {
    secondaryCCPCH-Info                 SecondaryCCPCH-Info,
    tfcs                                TFCS,
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            fach-PCH-InformationList            FACH-PCH-InformationList,
            sib-ReferenceListFACH               SIB-ReferenceListFACH
        },
        tdd                             SEQUENCE {
            fach-PCH-InformationList            FACH-PCH-InformationList
        }
    }
}

SCCPCH-SystemInformation ::=        SEQUENCE {
    secondaryCCPCH-Info                 SecondaryCCPCH-Info,
    tfcs                                TFCS                                OPTIONAL,
    fach-PCH-InformationList            FACH-PCH-InformationList            OPTIONAL,
    pich-Info                           PICH-Info                           OPTIONAL
}

SCCPCH-SystemInformation-LCR-r4-ext ::= SEQUENCE {
    secondaryCCPCH-LCR-Extensions   SecondaryCCPCH-Info-LCR-r4-ext,
-- pich-Info in the SCCPCH-SystemInformation IE shall be absent, and instead the following used.
    pich-Info                       PICH-Info-LCR-r4                        OPTIONAL
}

SCCPCH-SystemInformationList ::=    SEQUENCE (SIZE (1..maxSCCPCH)) OF
                                        SCCPCH-SystemInformation

-- The following list includes elements additional to those in
-- SCCPCH-SystemInformationList for the 1.28Mcps TDD. The order of the IEs
-- indicates which SCCPCH-SystemInformation-LCR-r4-ext IE extends which
-- SCCPCH-SystemInformation IE.
SCCPCH-SystemInformationList-LCR-r4-ext ::= SEQUENCE (SIZE (1..maxSCCPCH)) OF
                                                SCCPCH-SystemInformation-LCR-r4-ext

ScramblingCodeChange ::=            ENUMERATED {
                                        codeChange, noCodeChange }

ScramblingCodeType ::=              ENUMERATED {
                                        shortSC,
                                        longSC }

SecondaryCCPCH-Info ::=             SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            -- This IE is not used in this version of the specification and should be ignored.
            dummy1                          PCPICH-UsageForChannelEst,
            -- This IE is not used in this version of the specification.  It should not
            -- be sent and if received it should be ignored.
            dummy2                          SecondaryCPICH-Info             OPTIONAL,
            secondaryScramblingCode         SecondaryScramblingCode         OPTIONAL,
            sttd-Indicator                  BOOLEAN,
            sf-AndCodeNumber                SF256-AndCodeNumber,
            pilotSymbolExistence            BOOLEAN,
            tfci-Existence                  BOOLEAN,
            positionFixedOrFlexible         PositionFixedOrFlexible,
            timingOffset                    TimingOffset                    DEFAULT 0
        },
```

```
        tdd                             SEQUENCE {
            -- TABULAR: the offset is included in CommonTimeslotInfoSCCPCH
            commonTimeslotInfo              CommonTimeslotInfoSCCPCH,
            individualTimeslotInfo          IndividualTimeslotInfo,
            channelisationCode              SCCPCH-ChannelisationCodeList
        }
    }
}

SecondaryCCPCH-Info-r4 ::=      SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            pCPICH-UsageForChannelEst       PCPICH-UsageForChannelEst,
            secondaryCPICH-Info             SecondaryCPICH-Info             OPTIONAL,
            secondaryScramblingCode         SecondaryScramblingCode         OPTIONAL,
            sttd-Indicator                  BOOLEAN,
            sf-AndCodeNumber                SF256-AndCodeNumber,
            pilotSymbolExistence            BOOLEAN,
            tfci-Existence                  BOOLEAN,
            positionFixedOrFlexible         PositionFixedOrFlexible,
            timingOffset                    TimingOffset                    DEFAULT 0
        },
        tdd                             SEQUENCE {
            -- TABULAR: the offset is included in CommonTimeslotInfoSCCPCH
            commonTimeslotInfo              CommonTimeslotInfoSCCPCH,
            tddOption                       CHOICE {
                tdd384                          SEQUENCE {
                    individualTimeslotInfo          IndividualTimeslotInfo
                },
                tdd128                          SEQUENCE {
                    individualTimeslotInfo          IndividualTimeslotInfo-LCR-r4
                }
            },
            channelisationCode              SCCPCH-ChannelisationCodeList
        }
    }
}

SecondaryCCPCH-Info-LCR-r4-ext ::=  SEQUENCE {
    individualTimeslotLCR-Ext           IndividualTimeslotInfo-LCR-r4-ext
}

SecondaryCPICH-Info ::=             SEQUENCE {
    secondaryDL-ScramblingCode          SecondaryScramblingCode             OPTIONAL,
    channelisationCode                  ChannelisationCode256
}

SecondaryScramblingCode ::=         INTEGER (1..15)

SecondInterleavingMode ::=          ENUMERATED {
                                        frameRelated, timeslotRelated }

-- SF256-AndCodeNumber encodes both "Spreading factor" and "Code Number"
SF256-AndCodeNumber ::=             CHOICE {
    sf4                                 INTEGER (0..3),
    sf8                                 INTEGER (0..7),
    sf16                                INTEGER (0..15),
    sf32                                INTEGER (0..31),
    sf64                                INTEGER (0..63),
    sf128                               INTEGER (0..127),
    sf256                               INTEGER (0..255)
}

-- SF512-AndCodeNumber encodes both "Spreading factor" and "Code Number"
SF512-AndCodeNumber ::=             CHOICE {
    sf4                                 INTEGER (0..3),
    sf8                                 INTEGER (0..7),
    sf16                                INTEGER (0..15),
    sf32                                INTEGER (0..31),
    sf64                                INTEGER (0..63),
    sf128                               INTEGER (0..127),
    sf256                               INTEGER (0..255),
    sf512                               INTEGER (0..511)
}

-- SF512-AndPilot encodes both "Spreading factor" and "Number of bits for Pilot bits"
SF512-AndPilot ::=                  CHOICE {
    sfd4                                NULL,
```

```
	sfd8							NULL,
	sfd16							NULL,
	sfd32							NULL,
	sfd64							NULL,
	sfd128							PilotBits128,
	sfd256							PilotBits256,
	sfd512							NULL
}
SF-PDSCH ::=					ENUMERATED {
									sfp4, sfp8, sfp16, sfp32,
									sfp64, sfp128, sfp256 }

SF-PRACH ::=					ENUMERATED {
									sfpr32, sfpr64, sfpr128, sfpr256 }

SFN-TimeInfo ::=				SEQUENCE {
	activationTimeSFN				INTEGER (0..4095),
	physChDuration				DurationTimeInfo
}

SpecialBurstScheduling ::=			INTEGER (0..7)

SpreadingFactor::=				ENUMERATED {
									sf4, sf8, sf16, sf32,
									sf64, sf128, sf256 }

SRB-delay ::=					INTEGER (0..7)

SSDT-CellIdentity ::=			ENUMERATED {
									ssdt-id-a, ssdt-id-b, ssdt-id-c,
									ssdt-id-d, ssdt-id-e, ssdt-id-f,
									ssdt-id-g, ssdt-id-h }

SSDT-Information ::=			SEQUENCE {
	s-Field							S-Field,
	codeWordSet						CodeWordSet
}

SSDT-Information-r4 ::=			SEQUENCE {
	s-Field							S-Field,
	codeWordSet						CodeWordSet,
	ssdt-UL							SSDT-UL-r4						OPTIONAL
}

-- The following information element is used to extend the
-- SSDT-Information IE from Release 4 onwards.
SSDT-UL-r4 ::=					ENUMERATED {
									ul, ul-AndDL }

SynchronisationParameters-r4 ::=	SEQUENCE {
	sync-UL-CodesBitmap				BIT STRING {
										code7(0),
										code6(1),
										code5(2),
										code4(3),
										code3(4),
										code2(5),
										code1(6),
										code0(7)
										} (SIZE (8))				OPTIONAL,
	fpach-Info						FPACH-Info-r4,
	sync-UL-Procedure				SYNC-UL-Procedure-r4				OPTIONAL
}

SYNC-UL-Procedure-r4 ::=		SEQUENCE {
	max-SYNC-UL-Transmissions		ENUMERATED { tr1, tr2, tr4, tr8 },
	powerRampStep					INTEGER (0..3)
}

SYNC-UL-Info-r4 ::=				SEQUENCE {
	sync-UL-Codes-Bitmap			BIT STRING {
										code7(0),
										code6(1),
										code5(2),
										code4(3),
										code3(4),
										code2(5),
										code1(6),
```

```
                                        code0(7)
                                        } ( SIZE (8)),
    prxUpPCHdes                         INTEGER (0..62),
-- Actual value = (IE value * 0.5) - 11
    powerRampStep                       INTEGER (0..3),
    max-SYNC-UL-Transmissions           ENUMERATED { tr1, tr2, tr4, tr8 } ,
    mmax                                INTEGER(1..32)
}

TDD-FPACH-CCode16-r4 ::=            ENUMERATED {
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

TDD-PICH-CCode ::=                  ENUMERATED {
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

TDD-PRACH-CCode8 ::=                ENUMERATED {
                                        cc8-1, cc8-2, cc8-3, cc8-4,
                                        cc8-5, cc8-6, cc8-7, cc8-8 }

TDD-PRACH-CCode16 ::=               ENUMERATED {
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

TDD-PRACH-CCode-LCR-r4 ::=          ENUMERATED {
                                        cc4-1, cc4-2, cc4-3, cc4-4,
                                        cc8-1, cc8-2, cc8-3, cc8-4,
                                        cc8-5, cc8-6, cc8-7, cc8-8,
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

TDD-PRACH-CCodeList ::=             CHOICE {
    sf8                                 SEQUENCE (SIZE (1..8)) OF
                                            TDD-PRACH-CCode8,
    sf16                                SEQUENCE (SIZE (1..8)) OF
                                            TDD-PRACH-CCode16
}

TFC-ControlDuration ::=             ENUMERATED {
                                        tfc-cd1, tfc-cd2, tfc-cd4, tfc-cd8,
                                        tfc-cd16, tfc-cd24, tfc-cd32,
                                        tfc-cd48, tfc-cd64, tfc-cd128,
                                        tfc-cd192, tfc-cd256, tfc-cd512 }

TFCI-Coding ::=                     ENUMERATED {
                                        tfci-bits-4, tfci-bits-8,
                                        tfci-bits-16, tfci-bits-32 }

TGCFN ::=                           INTEGER (0..255)

-- The value 270 represents "undefined" in the tabular description.
TGD ::=                             INTEGER (15..270)

TGL ::=                             INTEGER (1..14)

TGMP ::=                            ENUMERATED {
                                        tdd-Measurement, fdd-Measurement,
                                        gsm-CarrierRSSIMeasurement,
                                        gsm-initialBSICIdentification, gsmBSICReconfirmation,
                                        multi-carrier }

TGP-Sequence ::=                    SEQUENCE {
    tgpsi                               TGPSI,
    tgps-Status                         CHOICE {
        activate                            SEQUENCE {
            tgcfn                               TGCFN
        },
        deactivate                          NULL
    },
```

```
    tgps-ConfigurationParams            TGPS-ConfigurationParams            OPTIONAL
}

TGPS-Reconfiguration-CFN ::=        INTEGER (0..255)

TGP-SequenceList ::=                SEQUENCE (SIZE (1..maxTGPS)) OF
                                        TGP-Sequence

TGP-SequenceShort ::=               SEQUENCE {
    tgpsi                               TGPSI,
    tgps-Status                         CHOICE {
        activate                            SEQUENCE {
            tgcfn                               TGCFN
        },
        deactivate                          NULL
    }
}

TGPL ::=                            INTEGER (1..144)

-- TABULAR: The value 0 represents "infinity" in the tabular description.
TGPRC ::=                           INTEGER (0..511)

TGPS-ConfigurationParams ::=        SEQUENCE {
    tgmp                                TGMP,
    tgprc                               TGPRC,
    tgsn                                TGSN,
    tgl1                                TGL,
    tgl2                                TGL                                 OPTIONAL,
    tgd                                 TGD,
    tgpl1                               TGPL,
    tgpl2                               TGPL                                OPTIONAL,
    rpp                                 RPP,
    itp                                 ITP,
    ul-DL-Mode                          UL-DL-Mode,
    -- TABULAR: Compressed mode method is nested inside UL-DL-Mode
    dl-FrameType                        DL-FrameType,
    deltaSIR1                           DeltaSIR,
    deltaSIRAfter1                      DeltaSIR,
    deltaSIR2                           DeltaSIR                            OPTIONAL,
    deltaSIRAfter2                      DeltaSIR                            OPTIONAL,
    nidentifyAbort                      NidentifyAbort                      OPTIONAL,
    treconfirmAbort                     TreconfirmAbort                     OPTIONAL
}

TGPSI ::=                           INTEGER (1..maxTGPS)

TGSN ::=                            INTEGER (0..14)

TimeInfo ::=                        SEQUENCE {
    activationTime                      ActivationTime                      OPTIONAL,
    durationTimeInfo                    DurationTimeInfo                    OPTIONAL
}

TimeslotList ::=                    SEQUENCE (SIZE (1..maxTS)) OF
                                        TimeslotNumber

TimeslotList-r4 ::=                 CHOICE {
    tdd384                              SEQUENCE (SIZE (1..maxTS)) OF
                                            TimeslotNumber,
    tdd128                              SEQUENCE (SIZE (1..maxTS-LCR)) OF
                                            TimeslotNumber-LCR-r4
}

-- If TimeslotNumber is included for a 1.28Mcps TDD description, it shall take values from 0..6
TimeslotNumber ::=                      INTEGER (0..14)

TimeslotNumber-LCR-r4 ::=               INTEGER (0..6)

TimeslotNumber-PRACH-LCR-r4 ::=     INTEGER (1..6)

TimeslotSync2 ::=               INTEGER (0..6)

-- Actual value = IE value * 256
TimingOffset ::=                    INTEGER (0..149)

TPC-CombinationIndex ::=            INTEGER (0..5)
```

```
TPC-StepSizeFDD ::=                 INTEGER (0..1)

-- Actual value = IE value + 1

TPC-StepSizeTDD ::=                 INTEGER (1..3)

-- Actual value = IE value * 0.5 seconds
TreconfirmAbort ::= INTEGER (1..20)

TX-DiversityMode ::=                ENUMERATED {
                                        noDiversity,
                                        sttd,
                                        closedLoopMode1,
                                        closedLoopMode2 }

UARFCN ::=                      INTEGER (0..16383)

UCSM-Info ::=                       SEQUENCE {
    minimumSpreadingFactor              MinimumSpreadingFactor,
    nf-Max                              NF-Max,
    channelReqParamsForUCSM             ChannelReqParamsForUCSM
}

UL-CCTrCH ::=                       SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    ul-TargetSIR                        UL-TargetSIR,
    timeInfo                            TimeInfo,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    ul-CCTrCH-TimeslotsCodes            UplinkTimeslotsCodes                OPTIONAL
}

UL-CCTrCH-r4 ::=                    SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain                  DEFAULT 1,
    ul-TargetSIR                        UL-TargetSIR,
    timeInfo                            TimeInfo,
    commonTimeslotInfo                  CommonTimeslotInfo                  OPTIONAL,
    tddOption                           CHOICE {
        tdd384                              SEQUENCE {
            ul-CCTrCH-TimeslotsCodes            UplinkTimeslotsCodes        OPTIONAL
        },
        tdd128                              SEQUENCE {
            ul-CCTrCH-TimeslotsCodes            UplinkTimeslotsCodes-LCR-r4 OPTIONAL
        }
    }
}

UL-CCTrCHList ::=                   SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        UL-CCTrCH

UL-CCTrCHList-r4 ::=                SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        UL-CCTrCH-r4

UL-CCTrChTPCList ::=                SEQUENCE (SIZE (0..maxCCTrCH)) OF
                                            TFCS-Identity

UL-ChannelRequirement ::=           CHOICE {
    ul-DPCH-Info                        UL-DPCH-Info,
    cpch-SetInfo                        CPCH-SetInfo
}

UL-ChannelRequirement-r4 ::=        CHOICE {
    ul-DPCH-Info                        UL-DPCH-Info-r4,
    cpch-SetInfo                        CPCH-SetInfo
}

UL-ChannelRequirementWithCPCH-SetID ::= CHOICE {
    ul-DPCH-Info                        UL-DPCH-Info,
    cpch-SetInfo                        CPCH-SetInfo,
    cpch-SetID                          CPCH-SetID
}

UL-ChannelRequirementWithCPCH-SetID-r4 ::=  CHOICE {
    ul-DPCH-Info                        UL-DPCH-Info-r4,
    cpch-SetInfo                        CPCH-SetInfo,
    cpch-SetID                          CPCH-SetID
}

UL-CompressedModeMethod ::=         ENUMERATED {
```

```
                                        sf-2,
                                        higherLayerScheduling }

UL-DL-Mode ::=                      CHOICE {
    ul                                  UL-CompressedModeMethod,
    dl                                  DL-CompressedModeMethod,
    ul-and-dl                               SEQUENCE {
        ul                                  UL-CompressedModeMethod,
        dl                                  DL-CompressedModeMethod
    }}

UL-DPCCH-SlotFormat ::=             ENUMERATED {
                                        slf0, slf1, slf2 }

UL-DPCH-Info ::=                    SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfo            OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            scramblingCodeType                  ScramblingCodeType,
            scramblingCode                      UL-ScramblingCode,
            numberOfDPDCH                       NumberOfDPDCH               DEFAULT 1,
            spreadingFactor                     SpreadingFactor,
            tfci-Existence                      BOOLEAN,
            numberOfFBI-Bits                    NumberOfFBI-Bits            OPTIONAL,
            -- The IE above is conditional based on history
            puncturingLimit                     PuncturingLimit
        },
        tdd                                 SEQUENCE {
            ul-TimingAdvance                    UL-TimingAdvanceControl     OPTIONAL,
            ul-CCTrCHList                       UL-CCTrCHList
        }
    }
}

UL-DPCH-Info-r4 ::=                 SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfo-r4         OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            scramblingCodeType                  ScramblingCodeType,
            scramblingCode                      UL-ScramblingCode,
            numberOfDPDCH                       NumberOfDPDCH               DEFAULT 1,
            spreadingFactor                     SpreadingFactor,
            tfci-Existence                      BOOLEAN,
            numberOfFBI-Bits                    NumberOfFBI-Bits            OPTIONAL,
            -- The IE above is conditional based on history
            puncturingLimit                     PuncturingLimit
        },
        tdd                                 SEQUENCE {
            ul-TimingAdvance                    UL-TimingAdvanceControl-r4  OPTIONAL,
            ul-CCTrCHList                       UL-CCTrCHList-r4
        }
    }
}

UL-DPCH-InfoPostFDD ::=             SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfoPostFDD,
            scramblingCodeType                  ScramblingCodeType,
            reducedScramblingCodeNumber         ReducedScramblingCodeNumber,
            spreadingFactor                     SpreadingFactor

}

UL-DPCH-InfoPostTDD ::=             SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfoPostTDD,
    ul-TimingAdvance                    UL-TimingAdvanceControl                 OPTIONAL,
    ul-CCTrCH-TimeslotsCodes            UplinkTimeslotsCodes
}

UL-DPCH-InfoPostTDD-LCR-r4 ::=      SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfoPostTDD-LCR-r4,
    ul-TimingAdvance                    UL-TimingAdvanceControl-LCR-r4              OPTIONAL,
    ul-CCTrCH-TimeslotsCodes            UplinkTimeslotsCodes-LCR-r4
}

UL-DPCH-InfoPredef ::=              SEQUENCE {
    ul-DPCH-PowerControlInfo            UL-DPCH-PowerControlInfoPredef,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
```

```
            tfci-Existence                      BOOLEAN,
            puncturingLimit                     PuncturingLimit
        },
        tdd                                 SEQUENCE {
            commonTimeslotInfo                  CommonTimeslotInfo
        }
    }
}

UL-DPCH-PowerControlInfo ::=        CHOICE {
    fdd                                 SEQUENCE {
        dpcch-PowerOffset                   DPCCH-PowerOffset,
        pc-Preamble                         PC-Preamble,
        sRB-delay                           SRB-delay,
        powerControlAlgorithm               PowerControlAlgorithm
        -- TABULAR: TPC step size nested inside PowerControlAlgorithm
    },
    tdd                                 SEQUENCE {
        ul-TargetSIR                        UL-TargetSIR                OPTIONAL,
        ul-OL-PC-Signalling                 CHOICE {
            broadcast-UL-OL-PC-info             NULL,
            handoverGroup                       SEQUENCE {
                individualTS-InterferenceList       IndividualTS-InterferenceList,
                dpch-ConstantValue                  ConstantValue,
                primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power
            }
        }                                                               OPTIONAL
    }
}

UL-DPCH-PowerControlInfo-r4 ::=     CHOICE {
    fdd                                 SEQUENCE {
        dpcch-PowerOffset                   DPCCH-PowerOffset,
        pc-Preamble                         PC-Preamble,
        powerControlAlgorithm               PowerControlAlgorithm
        -- TABULAR: TPC step size nested inside PowerControlAlgorithm
    },
    tdd                                 SEQUENCE {
        -- The IE ul-TargetSIR corresponds to PRX-PDPCHdes for 1.28Mcps TDD
        -- Actual value PRX-PDPCHdes = (value of IE "ul-TargetSIR" – 120)
        ul-TargetSIR                        UL-TargetSIR                OPTIONAL,
        ul-OL-PC-Signalling                 CHOICE {
            broadcast-UL-OL-PC-info             NULL,
            handoverGroup                       SEQUENCE {
                tddOption                           CHOICE {
                    tdd384                              SEQUENCE {
                        individualTS-InterferenceList       IndividualTS-InterferenceList,
                        dpch-ConstantValue                  ConstantValue
                    },
                    tdd128                              SEQUENCE {
                        tpc-StepSize                        TPC-StepSizeTDD
                    }
                },
                primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power
            }
        }
    }
}

UL-DPCH-PowerControlInfoPostFDD ::= SEQUENCE {
            dpcch-PowerOffset                   DPCCH-PowerOffset2, -- smaller range to save bits
            pc-Preamble                         PC-Preamble,
            sRB-delay                           SRB-delay
}

UL-DPCH-PowerControlInfoPostTDD ::= SEQUENCE {
    ul-TargetSIR                        UL-TargetSIR,
    ul-TimeslotInterference             UL-Interference
}

UL-DPCH-PowerControlInfoPostTDD-LCR-r4 ::=  SEQUENCE {
    ul-TargetSIR                        UL-TargetSIR
}

UL-DPCH-PowerControlInfoPredef ::=      CHOICE {
    fdd                                 SEQUENCE {
        powerControlAlgorithm               PowerControlAlgorithm
        -- TABULAR: TPC step size nested inside PowerControlAlgorithm
```

```
    },
    tdd                                 SEQUENCE {
-- The following IE shall be ignored if in 1.28Mcps TDD mode.
        dpch-ConstantValue                  ConstantValue
    }
}

UL-Interference ::=                 INTEGER (-110..-70)

UL-ScramblingCode ::=               INTEGER (0..16777215)


UL-SynchronisationParameters-r4 ::= SEQUENCE {
    stepSize                            INTEGER (1..8),
    frequency                           INTEGER (1..8)
}

-- Actual value = (IE value * 0.5) - 11
UL-TargetSIR ::=                    INTEGER (0..62)

UL-TimingAdvance ::=                INTEGER (0..63)

UL-TimingAdvanceControl ::=         CHOICE {
    disabled                            NULL,
    enabled                             SEQUENCE {
        ul-TimingAdvance                    UL-TimingAdvance                OPTIONAL,
        activationTime                      ActivationTime                  OPTIONAL
    }
}

UL-TimingAdvanceControl-r4 ::=      CHOICE {
    disabled                            NULL,
    enabled                             SEQUENCE {
        tddOption                           CHOICE {
            tdd384                              SEQUENCE {
                ul-TimingAdvance                    UL-TimingAdvance                OPTIONAL,
                activationTime                      ActivationTime                  OPTIONAL
            },
            tdd128                              SEQUENCE {
                ul-SynchronisationParameters        UL-SynchronisationParameters-r4 OPTIONAL,
                synchronisationParameters           SynchronisationParameters-r4    OPTIONAL
            }
        }
    }
}

UL-TimingAdvanceControl-LCR-r4 ::=  CHOICE {
    disabled                            NULL,
    enabled                             SEQUENCE {
        ul-SynchronisationParameters        UL-SynchronisationParameters-r4 OPTIONAL,
        synchronisationParameters           SynchronisationParameters-r4    OPTIONAL
    }
}

UL-TS-ChannelisationCode ::=        ENUMERATED {
                                        cc1-1, cc2-1, cc2-2,
                                        cc4-1, cc4-2, cc4-3, cc4-4,
                                        cc8-1, cc8-2, cc8-3, cc8-4,
                                        cc8-5, cc8-6, cc8-7, cc8-8,
                                        cc16-1, cc16-2, cc16-3, cc16-4,
                                        cc16-5, cc16-6, cc16-7, cc16-8,
                                        cc16-9, cc16-10, cc16-11, cc16-12,
                                        cc16-13, cc16-14, cc16-15, cc16-16 }

UL-TS-ChannelisationCodeList ::=    SEQUENCE (SIZE (1..2)) OF
                                        UL-TS-ChannelisationCode

UplinkAdditionalTimeslots ::=       SEQUENCE {
    parameters                          CHOICE {
        sameAsLast                          SEQUENCE {
            timeslotNumber                      TimeslotNumber
        },
        newParameters                       SEQUENCE {
            individualTimeslotInfo                  IndividualTimeslotInfo,
            ul-TS-ChannelisationCodeList            UL-TS-ChannelisationCodeList
        }
    }
}
```

```
UplinkAdditionalTimeslots-LCR-r4 ::=    SEQUENCE {
    parameters                          CHOICE {
        sameAsLast                          SEQUENCE {
            timeslotNumber                      TimeslotNumber
        },
        newParameters                       SEQUENCE {
            individualTimeslotInfo                  IndividualTimeslotInfo-LCR-r4,
            ul-TS-ChannelisationCodeList            UL-TS-ChannelisationCodeList
        }
    }
}

UplinkTimeslotsCodes ::=            SEQUENCE {
    dynamicSFusage                      BOOLEAN,
    firstIndividualTimeslotInfo         IndividualTimeslotInfo,
    ul-TS-ChannelisationCodeList        UL-TS-ChannelisationCodeList,
    moreTimeslots                       CHOICE {
        noMore                              NULL,
        additionalTimeslots                 CHOICE {
            consecutive                         SEQUENCE {
                numAdditionalTimeslots              INTEGER (1..maxTS-1)
            },
            timeslotList                        SEQUENCE (SIZE (1..maxTS-1)) OF
                                                    UplinkAdditionalTimeslots
        }
    }
}

UplinkTimeslotsCodes-LCR-r4 ::=     SEQUENCE {
    dynamicSFusage                      BOOLEAN,
    firstIndividualTimeslotInfo         IndividualTimeslotInfo-LCR-r4,
    ul-TS-ChannelisationCodeList        UL-TS-ChannelisationCodeList,
    moreTimeslots                       CHOICE {
        noMore                              NULL,
        additionalTimeslots                 CHOICE {
            consecutive                         SEQUENCE {
                numAdditionalTimeslots              INTEGER (1..maxTS-LCR-1)
            },
            timeslotList                        SEQUENCE (SIZE (1..maxTS-LCR-1)) OF
                                                    UplinkAdditionalTimeslots-LCR-r4
        }
    }
}

Wi-LCR ::=                                                                  INTEGER(1..4)

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

AcquisitionSatInfo ::=              SEQUENCE {
    satID                               SatID,
    -- Actual value = IE value * 2.5
    doppler0thOrder                     INTEGER (-2048..2047),
    extraDopplerInfo                    ExtraDopplerInfo                OPTIONAL,
    codePhase                           INTEGER (0..1022),
    integerCodePhase                    INTEGER (0..19),
    gps-BitNumber                       INTEGER (0..3),
    codePhaseSearchWindow               CodePhaseSearchWindow,
    azimuthAndElevation                 AzimuthAndElevation             OPTIONAL
}

AcquisitionSatInfoList ::=          SEQUENCE (SIZE (1..maxSat)) OF
                                        AcquisitionSatInfo


AdditionalMeasurementID-List ::=    SEQUENCE (SIZE (1..maxAdditionalMeas)) OF
                                        MeasurementIdentity

AlmanacSatInfo ::=                  SEQUENCE {
    dataID                              INTEGER (0..3),
    satID                               SatID,
    e                                   BIT STRING (SIZE (16)),
    t-oa                                BIT STRING (SIZE (8)),
    deltaI                              BIT STRING (SIZE (16)),
```

```
    omegaDot                            BIT STRING (SIZE (16)),
    satHealth                           BIT STRING (SIZE (8)),
    a-Sqrt                              BIT STRING (SIZE (24)),
    omega0                              BIT STRING (SIZE (24)),
    m0                                  BIT STRING (SIZE (24)),
    omega                               BIT STRING (SIZE (24)),
    af0                                 BIT STRING (SIZE (11)),
    af1                                 BIT STRING (SIZE (11))
}

AlmanacSatInfoList ::=              SEQUENCE (SIZE (1..maxSat)) OF
                                        AlmanacSatInfo

AverageRLC-BufferPayload ::=        ENUMERATED {
                                        pla0, pla4, pla8, pla16, pla32,
                                        pla64, pla128, pla256, pla512,
                                        pla1024, pla2k, pla4k, pla8k, pla16k,
                                        pla32k, pla64k, pla128k, pla256k,
                                        pla512k, pla1024k }

AzimuthAndElevation ::=             SEQUENCE {
    -- Actual value = IE value * 11.25
    azimuth                             INTEGER (0..31),
    -- Actual value = IE value * 11.25
    elevation                           INTEGER (0..7)
}

BadSatList ::=                      SEQUENCE (SIZE (1..maxSat)) OF
                                        INTEGER (0..63)

Frequency-Band ::=                  ENUMERATED {
                                        dcs1800BandUsed, pcs1900BandUsed }

BCCH-ARFCN ::=                      INTEGER (0..1023)

BLER-MeasurementResults ::=         SEQUENCE {
    transportChannelIdentity            TransportChannelIdentity,
    dl-TransportChannelBLER             DL-TransportChannelBLER             OPTIONAL
}

BLER-MeasurementResultsList ::=     SEQUENCE (SIZE (1..maxTrCH)) OF
                                        BLER-MeasurementResults

BLER-TransChIdList ::=              SEQUENCE (SIZE (1..maxTrCH)) OF
                                        TransportChannelIdentity

BSIC-VerificationRequired ::=       ENUMERATED {
                                        required, notRequired }

BSICReported ::=                    CHOICE {
    -- Value maxCellMeas is not allowed for verifiedBSIC
    verifiedBSIC                        INTEGER (0..maxCellMeas),
    nonVerifiedBSIC                     BCCH-ARFCN
}

BurstModeParameters ::=             SEQUENCE {
    burstStart                          INTEGER (0..15),
    burstLength                         INTEGER (10..25),
    burstFreq                           INTEGER (1..16)
}

CellDCH-ReportCriteria ::=          CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria,
    periodicalReportingCriteria         PeriodicalReportingCriteria
}

CellDCH-ReportCriteria-LCR-r4 ::=   CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria-LCR-r4,
    periodicalReportingCriteria         PeriodicalReportingCriteria
}

-- Actual value = IE value * 0.5
CellIndividualOffset ::=            INTEGER (-20..20)


CellInfo ::=                        SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
```

```
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info,
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList            OPTIONAL,
            readSFN-Indicator                   BOOLEAN
        }
    }
}

CellInfo-r4 ::=                     SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info-r4,
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList-r4         OPTIONAL,
            readSFN-Indicator                   BOOLEAN

        }
    }
}

CellInfoSI-RSCP ::=                 SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info,
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList            OPTIONAL,
            readSFN-Indicator                   BOOLEAN
        }
    },
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-RSCP        OPTIONAL
}

CellInfoSI-RSCP-LCR-r4 ::=          SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    primaryCCPCH-Info                   PrimaryCCPCH-Info-LCR-r4,
    primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power               OPTIONAL,
    timeslotInfoList                    TimeslotInfoList-LCR-r4             OPTIONAL,
    readSFN-Indicator                   BOOLEAN,
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-RSCP        OPTIONAL
}

CellInfoSI-ECN0 ::=                 SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info,
```

```
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList            OPTIONAL,
            readSFN-Indicator                   BOOLEAN
        }
    },
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-ECN0    OPTIONAL
}

CellInfoSI-ECN0-LCR-r4 ::=          SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    primaryCCPCH-Info                   PrimaryCCPCH-Info-LCR-r4,
    primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power               OPTIONAL,
    timeslotInfoList                    TimeslotInfoList-LCR-r4             OPTIONAL,
    readSFN-Indicator                   BOOLEAN,
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-ECN0    OPTIONAL
}

CellInfoSI-HCS-RSCP ::=             SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info,
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList            OPTIONAL,
            readSFN-Indicator                   BOOLEAN
        }
    },
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-HCS-RSCP    OPTIONAL
}

CellInfoSI-HCS-RSCP-LCR-r4 ::=      SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    primaryCCPCH-Info                   PrimaryCCPCH-Info-LCR-r4,
    primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power               OPTIONAL,
    timeslotInfoList                    TimeslotInfoList-LCR-r4             OPTIONAL,
    readSFN-Indicator                   BOOLEAN,
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-HCS-RSCP    OPTIONAL
}

CellInfoSI-HCS-ECN0 ::=             SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info           OPTIONAL,
            primaryCPICH-TX-Power               PrimaryCPICH-TX-Power       OPTIONAL,
            readSFN-Indicator                   BOOLEAN,
            tx-DiversityIndicator               BOOLEAN
        },
        tdd                                 SEQUENCE {
            primaryCCPCH-Info                   PrimaryCCPCH-Info,
            primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power       OPTIONAL,
            timeslotInfoList                    TimeslotInfoList            OPTIONAL,
            readSFN-Indicator                   BOOLEAN
        }
    },
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-HCS-ECN0    OPTIONAL
}

CellInfoSI-HCS-ECN0-LCR-r4 ::=      SEQUENCE {
    cellIndividualOffset                CellIndividualOffset                DEFAULT 0,
    referenceTimeDifferenceToCell       ReferenceTimeDifferenceToCell       OPTIONAL,
    primaryCCPCH-Info                   PrimaryCCPCH-Info-LCR-r4,
    primaryCCPCH-TX-Power               PrimaryCCPCH-TX-Power               OPTIONAL,
    timeslotInfoList                    TimeslotInfoList-LCR-r4             OPTIONAL,
    readSFN-Indicator                   BOOLEAN,
    cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12-HCS-ECN0    OPTIONAL
}
```

```
CellMeasuredResults ::=            SEQUENCE {
    cellIdentity                       CellIdentity                    OPTIONAL,
    sfn-SFN-ObsTimeDifference          SFN-SFN-ObsTimeDifference       OPTIONAL,
    cellSynchronisationInfo        CellSynchronisationInfo         OPTIONAL,
    modeSpecificInfo                   CHOICE {
        fdd                                SEQUENCE {
            primaryCPICH-Info                  PrimaryCPICH-Info,
            cpich-Ec-N0                        CPICH-Ec-N0                 OPTIONAL,
            cpich-RSCP                         CPICH-RSCP                  OPTIONAL,
            pathloss                           Pathloss                    OPTIONAL
        },
        tdd                                SEQUENCE {
            cellParametersID                   CellParametersID,
            proposedTGSN                       TGSN                        OPTIONAL,
            primaryCCPCH-RSCP                  PrimaryCCPCH-RSCP           OPTIONAL,
            pathloss                           Pathloss                    OPTIONAL,
            timeslotISCP-List                  TimeslotISCP-List           OPTIONAL
        }
    }
}

CellMeasurementEventResults ::=     CHOICE {
    fdd                                SEQUENCE (SIZE (1..maxCellMeas)) OF
                                           PrimaryCPICH-Info,
    tdd                                SEQUENCE (SIZE (1..maxCellMeas)) OF
                                           PrimaryCCPCH-Info
}

CellMeasurementEventResults-LCR-r4 ::=  SEQUENCE (SIZE (1..maxCellMeas)) OF
                                           PrimaryCCPCH-Info-LCR-r4

CellReportingQuantities ::=         SEQUENCE {
    sfn-SFN-OTD-Type                   SFN-SFN-OTD-Type,
    cellIdentity-reportingIndicator                   BOOLEAN,
    cellSynchronisationInfoReportingIndicator         BOOLEAN,
    modeSpecificInfo                   CHOICE {
        fdd                                SEQUENCE {
            cpich-Ec-N0-reportingIndicator                        BOOLEAN,
            cpich-RSCP-reportingIndicator                         BOOLEAN,
            pathloss-reportingIndicator                       BOOLEAN
        },
        tdd                                SEQUENCE {
            timeslotISCP-reportingIndicator                   BOOLEAN,
            proposedTGSN-ReportingRequired                    BOOLEAN,
            primaryCCPCH-RSCP-reportingIndicator                  BOOLEAN,
            pathloss-reportingIndicator                       BOOLEAN
        }
    }
}

CellSelectReselectInfoSIB-11-12 ::= SEQUENCE {
    q-Offset1S-N                       Q-OffsetS-N                     DEFAULT 0,
    q-Offset2S-N                       Q-OffsetS-N                     OPTIONAL,
    maxAllowedUL-TX-Power              MaxAllowedUL-TX-Power           OPTIONAL,
    hcs-NeighbouringCellInformation-RSCP       HCS-NeighbouringCellInformation-RSCP
    OPTIONAL,
    modeSpecificInfo                   CHOICE {
        fdd                                SEQUENCE {
            q-QualMin                          Q-QualMin                   OPTIONAL,
            q-RxlevMin                         Q-RxlevMin                  OPTIONAL
        },
        tdd                                SEQUENCE {
            q-RxlevMin                         Q-RxlevMin                  OPTIONAL
        },
        gsm                                SEQUENCE {
            q-RxlevMin                         Q-RxlevMin                  OPTIONAL
        }
    }
}

CellSelectReselectInfoSIB-11-12-RSCP ::=    SEQUENCE {
    q-OffsetS-N                    Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power              MaxAllowedUL-TX-Power           OPTIONAL,
    modeSpecificInfo                   CHOICE {
        fdd                                SEQUENCE {
            q-QualMin                          Q-QualMin                   OPTIONAL,
            q-RxlevMin                         Q-RxlevMin                  OPTIONAL
        },
```

```
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}

CellSelectReselectInfoSIB-11-12-ECN0 ::=    SEQUENCE {
    q-Offset1S-N                        Q-OffsetS-N                     DEFAULT 0,
    q-Offset2S-N                        Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power               OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            q-QualMin                           Q-QualMin                   OPTIONAL,
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}

CellSelectReselectInfoSIB-11-12-HCS-RSCP ::=    SEQUENCE {
    q-OffsetS-N                     Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power               OPTIONAL,
    hcs-NeighbouringCellInformation-RSCP        HCS-NeighbouringCellInformation-RSCP
    OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            q-QualMin                           Q-QualMin                   OPTIONAL,
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}

CellSelectReselectInfoSIB-11-12-HCS-ECN0 ::=    SEQUENCE {
    q-Offset1S-N                        Q-OffsetS-N                     DEFAULT 0,
    q-Offset2S-N                        Q-OffsetS-N                     DEFAULT 0,
    maxAllowedUL-TX-Power               MaxAllowedUL-TX-Power               OPTIONAL,
    hcs-NeighbouringCellInformation-ECN0        HCS-NeighbouringCellInformation-ECN0
    OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            q-QualMin                           Q-QualMin                   OPTIONAL,
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        tdd                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        },
        gsm                                 SEQUENCE {
            q-RxlevMin                          Q-RxlevMin                  OPTIONAL
        }
    }
}

CellsForInterFreqMeasList ::=       SEQUENCE (SIZE  (1..maxCellMeas)) OF
                                        InterFreqCellID
CellsForInterRATMeasList ::=            SEQUENCE (SIZE  (1..maxCellMeas)) OF
                                        InterRATCellID
CellsForIntraFreqMeasList ::=       SEQUENCE (SIZE  (1..maxCellMeas)) OF
                                        IntraFreqCellID

CellSynchronisationInfo ::=         SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            countC-SFN-Frame-difference         CountC-SFN-Frame-difference     OPTIONAL,
            tm                                  INTEGER(0..38399)
```

```
        },
        tdd                                 SEQUENCE {
            countC-SFN-Frame-difference         CountC-SFN-Frame-difference     OPTIONAL
        }
    }
}

CellToReport ::=                    SEQUENCE {
    bsicReported                        BSICReported
}

CellToReportList ::=                SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        CellToReport

CodePhaseSearchWindow ::=           ENUMERATED {
                                        w1023, w1, w2, w3, w4, w6, w8,
                                        w12, w16, w24, w32, w48, w64,
                                        w96, w128, w192 }

CountC-SFN-Frame-difference ::= SEQUENCE {
    countC-SFN-High                 INTEGER(0..15),         -- Actual value = IE value * 256
    off                             INTEGER(0..255)
}

-- It is not allowed to send value 50 in this version of the specification
CPICH-Ec-N0 ::=                     INTEGER (0..50)

CPICH-RSCP ::=                      INTEGER (0..91)


DeltaPRC ::=                        INTEGER (-127..127)

-- Actual value = IE value * 0.032
DeltaRRC ::=                        INTEGER (-7..7)

DGPS-CorrectionSatInfo ::=          SEQUENCE {
    satID                               SatID,
    iode                                IODE,
    udre                                UDRE,
    prc                                 PRC,
    rrc                                 RRC,
    deltaPRC2                           DeltaPRC,
    deltaRRC2                           DeltaRRC,
    deltaPRC3                           DeltaPRC            OPTIONAL,
    deltaRRC3                           DeltaRRC            OPTIONAL
}

DGPS-CorrectionSatInfoList ::=      SEQUENCE (SIZE (1..maxSat)) OF
                                        DGPS-CorrectionSatInfo

DiffCorrectionStatus ::=            ENUMERATED {
                                        udre-1-0, udre-0-75, udre-0-5, udre-0-3,
                                        udre-0-2, udre-0-1, noData, invalidData }

DL-TransportChannelBLER ::=         INTEGER (0..63)

DopplerUncertainty ::=              ENUMERATED {
                                        hz12-5, hz25, hz50, hz100, hz200 }

EllipsoidPoint ::=                  SEQUENCE {
    latitudeSign        ENUMERATED { north, south },
    latitude            INTEGER (0..8388607),
    longitude           INTEGER (-8388608..8388607)
}


EllipsoidPointAltitude ::=          SEQUENCE {
    latitudeSign        ENUMERATED { north, south },
    latitude            INTEGER (0..8388607),
    longitude           INTEGER (-8388608..8388607),
    altitudeDirection   ENUMERATED {height, depth},
    altitude            INTEGER (0..32767)
}


EllipsoidPointAltitudeEllipsoide ::=    SEQUENCE {
    latitudeSign            ENUMERATED { north, south },
    latitude                INTEGER (0..8388607),
```

```
    longitude               INTEGER (-8388608..8388607),
    altitudeDirection       ENUMERATED {height, depth},
    altitude                INTEGER (0..32767),
    uncertaintySemiMajor    INTEGER (0..127),
    uncertaintySemiMinor    INTEGER (0..127),
    orientationMajorAxis    INTEGER (0..89),
    uncertaintyAltitude     INTEGER (0..127),
    confidence              INTEGER (0..100)
}


EllipsoidPointUncertCircle ::=      SEQUENCE {
    latitudeSign            ENUMERATED { north, south },
    latitude                INTEGER (0..8388607),
    longitude               INTEGER (-8388608..8388607),
    uncertaintyCode         INTEGER (0..127)
}


EllipsoidPointUncertEllipse ::=     SEQUENCE {
    latitudeSign            ENUMERATED { north, south },
    latitude                INTEGER (0..8388607),
    longitude               INTEGER (-8388608..8388607),
    uncertaintySemiMajor    INTEGER (0..127),
    uncertaintySemiMinor    INTEGER (0..127),
    orientationMajorAxis    INTEGER (0..89),
    confidence              INTEGER (0..100)
}


EnvironmentCharacterisation ::=     ENUMERATED {
                                        possibleHeavyMultipathNLOS,
                                        lightMultipathLOS,
                                        notDefined }

Event1a ::=                         SEQUENCE {
    triggeringCondition                 TriggeringCondition2,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList             OPTIONAL,
    w                                   W,
    reportDeactivationThreshold         ReportDeactivationThreshold,
    reportingAmount                     ReportingAmount,
    reportingInterval                   ReportingInterval
}

Event1a-r4 ::=                      SEQUENCE {
    triggeringCondition                 TriggeringCondition2,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList-r4          OPTIONAL,
    w                                   W,
    reportDeactivationThreshold         ReportDeactivationThreshold,
    reportingAmount                     ReportingAmount,
    reportingInterval                   ReportingInterval
}

Event1a-LCR-r4 ::=                  SEQUENCE {
    triggeringCondition                 TriggeringCondition2,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList-LCR-r4          OPTIONAL,
    w                                   W,
    reportDeactivationThreshold         ReportDeactivationThreshold,
    reportingAmount                     ReportingAmount,
    reportingInterval                   ReportingInterval
}

Event1b ::=                         SEQUENCE {
    triggeringCondition                 TriggeringCondition1,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList             OPTIONAL,
    w                                   W
}

Event1b-r4 ::=                      SEQUENCE {
    triggeringCondition                 TriggeringCondition1,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList-r4          OPTIONAL,
    w                                   W
}
```

```
Event1b-LCR-r4 ::=                  SEQUENCE {
    triggeringCondition                 TriggeringCondition1,
    reportingRange                      ReportingRange,
    forbiddenAffectCellList             ForbiddenAffectCellList-LCR-r4          OPTIONAL,
    w                                   W
}

Event1c ::=                         SEQUENCE {
    replacementActivationThreshold      ReplacementActivationThreshold,
    reportingAmount                     ReportingAmount,
    reportingInterval                   ReportingInterval
}

Event1e ::=                     SEQUENCE {
    triggeringCondition                 TriggeringCondition2,
    thresholdUsedFrequency              ThresholdUsedFrequency
}

Event1f ::=                     SEQUENCE {
    triggeringCondition                 TriggeringCondition1,
    thresholdUsedFrequency              ThresholdUsedFrequency
}

Event2a ::=                         SEQUENCE {
    dummy                               Threshold,
    -- IE “dummy” shall not be sent and shall be ignored if received.
    -- IE “dummy” should be removed in later versions of the message including this IE
    usedFreqW                           W,
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL,
    nonUsedFreqParameterList            NonUsedFreqParameterList            OPTIONAL
}

Event2b ::=                         SEQUENCE {
    usedFreqThreshold                   Threshold,
    usedFreqW                           W,
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL,
    nonUsedFreqParameterList            NonUsedFreqParameterList            OPTIONAL
}

Event2c ::=                         SEQUENCE {
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL,
    nonUsedFreqParameterList            NonUsedFreqParameterList            OPTIONAL
}

Event2d ::=                         SEQUENCE {
    usedFreqThreshold                   Threshold,
    usedFreqW                           W,
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

Event2e ::=                         SEQUENCE {
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL,
    nonUsedFreqParameterList            NonUsedFreqParameterList            OPTIONAL
}

Event2f ::=                         SEQUENCE {
    usedFreqThreshold                   Threshold,
    usedFreqW                           W,
    hysteresis                          HysteresisInterFreq,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

Event3a ::=                         SEQUENCE {
    thresholdOwnSystem                  Threshold,
    w                                   W,
    thresholdOtherSystem                Threshold,
```

```
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

Event3b ::=                         SEQUENCE {
    thresholdOtherSystem                Threshold,
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL

}

Event3c ::=                         SEQUENCE {
    thresholdOtherSystem                Threshold,
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

Event3d ::=                         SEQUENCE {
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

EventIDInterFreq ::=                ENUMERATED {
                                        e2a, e2b, e2c, e2d, e2e, e2f }

EventIDInterRAT ::=                 ENUMERATED {
                                        e3a, e3b, e3c, e3d }

EventIDIntraFreq ::=                ENUMERATED {
                                        e1a, e1b, e1c, e1d, e1e,
                                        e1f, e1g, e1h, e1i }

EventResults ::=                    CHOICE {
    intraFreqEventResults               IntraFreqEventResults,
    interFreqEventResults               InterFreqEventResults,
    interRATEventResults                InterRATEventResults,
    trafficVolumeEventResults           TrafficVolumeEventResults,
    qualityEventResults                 QualityEventResults,
    ue-InternalEventResults             UE-InternalEventResults,
    ue-positioning-MeasurementEventResults          UE-Positioning-MeasurementEventResults
}

ExtraDopplerInfo ::=                SEQUENCE {
    -- Actual value = IE value * 0.023
    doppler1stOrder                     INTEGER (-42..21),
    dopplerUncertainty                  DopplerUncertainty
}

FACH-MeasurementOccasionInfo ::=    SEQUENCE {
    fACH-meas-occasion-coeff            INTEGER (1..12)                     OPTIONAL,
    inter-freq-FDD-meas-ind             BOOLEAN,
-- The following IE is for 3.84Mcps TDD. For 1.28Mcps TDD, the IE in
-- FACH-MeasurementOccasionInfo-LCR-r4-ext is used.
    inter-freq-TDD-meas-ind             BOOLEAN,
    inter-RAT-meas-ind                  SEQUENCE (SIZE (1..maxOtherRAT)) OF
                                            RAT-Type                        OPTIONAL
}

FACH-MeasurementOccasionInfo-LCR-r4-ext ::= SEQUENCE {
    inter-freq-TDD128-meas-ind                  BOOLEAN
}

FilterCoefficient ::=               ENUMERATED {
                                        fc0, fc1, fc2, fc3, fc4, fc5,
                                        fc6, fc7, fc8, fc9, fc11, fc13,
                                        fc15, fc17, fc19, spare1 }

-- Actual value = IE value * 0.0625
FineSFN-SFN ::=                     INTEGER (0..15)

ForbiddenAffectCell ::=             CHOICE {
    fdd                                 PrimaryCPICH-Info,
    tdd                                 PrimaryCCPCH-Info
}
```

```
ForbiddenAffectCell-r4 ::=          CHOICE {
    fdd                                 PrimaryCPICH-Info,
    tdd                                 PrimaryCCPCH-Info-r4
}

ForbiddenAffectCell-LCR-r4 ::=      SEQUENCE {
    tdd                                 PrimaryCCPCH-Info-LCR-r4
}

ForbiddenAffectCellList ::=         SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        ForbiddenAffectCell

ForbiddenAffectCellList-r4 ::=          SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        ForbiddenAffectCell-r4

ForbiddenAffectCellList-LCR-r4 ::=  SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        ForbiddenAffectCell-LCR-r4

FreqQualityEstimateQuantity-FDD ::= ENUMERATED {
                                        cpich-Ec-N0,
                                        cpich-RSCP }

FreqQualityEstimateQuantity-TDD ::= ENUMERATED {
                                        primaryCCPCH-RSCP }

GPS-MeasurementParam ::=            SEQUENCE {
    satelliteID                         INTEGER (0..63),
    c-N0                                INTEGER (0..63),
    doppler                             INTEGER (-32768..32768),
    wholeGPS-Chips                      INTEGER (0..1023),
    fractionalGPS-Chips                 INTEGER (0..1023),
    multipathIndicator                  MultipathIndicator,
    pseudorangeRMS-Error                INTEGER (0..63)
}

GPS-MeasurementParamList ::=        SEQUENCE (SIZE (1..maxSat)) OF
                                        GPS-MeasurementParam

GSM-CarrierRSSI ::=                 BIT STRING (SIZE (6))


GSM-MeasuredResults ::=             SEQUENCE {
    gsm-CarrierRSSI                     GSM-CarrierRSSI                     OPTIONAL,
    dummy                               INTEGER (46..158)                   OPTIONAL,
    bsicReported                        BSICReported,
    observedTimeDifferenceToGSM         ObservedTimeDifferenceToGSM         OPTIONAL
}

GSM-MeasuredResultsList ::=         SEQUENCE (SIZE (1..maxReportedGSMCells)) OF
                                        GSM-MeasuredResults

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

HCS-CellReselectInformation-RSCP ::=        SEQUENCE {
    penaltyTime                                 PenaltyTime-RSCP
    -- TABULAR: The default value is "notUsed", temporary offset is nested inside PenaltyTime
}

HCS-CellReselectInformation-ECN0 ::=        SEQUENCE {
    penaltyTime                         PenaltyTime-ECN0
    -- TABULAR: The default value is "notUsed", temporary offset is nested inside PenaltyTime
}

HCS-NeighbouringCellInformation-RSCP ::= SEQUENCE {
    hcs-PRIO                            HCS-PRIO                            DEFAULT 0,
    q-HCS                               Q-HCS                               DEFAULT 0,
```

```
    hcs-CellReselectInformation         HCS-CellReselectInformation-RSCP
}

HCS-NeighbouringCellInformation-ECN0 ::= SEQUENCE {
    hcs-PRIO                            HCS-PRIO                            DEFAULT 0,
    q-HCS                               Q-HCS                               DEFAULT 0,
    hcs-CellReselectInformation         HCS-CellReselectInformation-ECN0
}

HCS-PRIO ::=                        INTEGER (0..7)

HCS-ServingCellInformation ::=      SEQUENCE {
    hcs-PRIO                            HCS-PRIO                            DEFAULT 0,
    q-HCS                               Q-HCS                               DEFAULT 0,
    t-CR-Max                            T-CRMax                             OPTIONAL
}

-- Actual value = IE value * 0.5
Hysteresis ::=                      INTEGER (0..15)

-- Actual value = IE value * 0.5
HysteresisInterFreq ::=             INTEGER (0..29)

InterFreqCell ::=                   SEQUENCE {
    frequencyInfo                       FrequencyInfo,
    nonFreqRelatedEventResults          CellMeasurementEventResults
}

InterFreqCell-LCR-r4 ::=            SEQUENCE {
    frequencyInfo                       FrequencyInfo,
    nonFreqRelatedEventResults          CellMeasurementEventResults-LCR-r4
}

InterFreqCellID ::=                 INTEGER (0..maxCellMeas-1)

InterFreqCellInfoList ::=           SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellList                OPTIONAL,
    cellsForInterFreqMeasList           CellsForInterFreqMeasList           OPTIONAL
}

InterFreqCellInfoList-r4 ::=        SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellList-r4             OPTIONAL
}

InterFreqCellInfoSI-List-RSCP ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-RSCP        OPTIONAL
}

InterFreqCellInfoSI-List-ECN0 ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-ECN0        OPTIONAL
}

InterFreqCellInfoSI-List-HCS-RSCP ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-HCS-RSCP    OPTIONAL
}
InterFreqCellInfoSI-List-HCS-ECN0 ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-HCS-ECN0    OPTIONAL
}

InterFreqCellInfoSI-List-RSCP-LCR ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-RSCP-LCR-r4     OPTIONAL
}

InterFreqCellInfoSI-List-ECN0-LCR ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-ECN0-LCR-r4     OPTIONAL
}

InterFreqCellInfoSI-List-HCS-RSCP-LCR ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-HCS-RSCP-LCR-r4 OPTIONAL
```

```
}
InterFreqCellInfoSI-List-HCS-ECN0-LCR ::=       SEQUENCE {
    removedInterFreqCellList            RemovedInterFreqCellList            OPTIONAL,
    newInterFreqCellList                NewInterFreqCellSI-List-HCS-ECN0-LCR-r4 OPTIONAL
}

InterFreqCellList ::=               SEQUENCE (SIZE (1..maxFreq)) OF
                                        InterFreqCell

InterFreqCellList-LCR-r4-ext ::=    SEQUENCE (SIZE (1..maxFreq)) OF
                                        InterFreqCell-LCR-r4

InterFreqCellMeasuredResultsList ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        CellMeasuredResults

InterFreqEvent ::=                  CHOICE {
    event2a                             Event2a,
    event2b                             Event2b,
    event2c                             Event2c,
    event2d                             Event2d,
    event2e                             Event2e,
    event2f                             Event2f
}

InterFreqEventList ::=              SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        InterFreqEvent


InterFreqEventResults ::=           SEQUENCE {
    eventID                             EventIDInterFreq,
    interFreqCellList                   InterFreqCellList                   OPTIONAL
}

InterFreqEventResults-LCR-r4-ext ::=    SEQUENCE {
    eventID                             EventIDInterFreq,
    interFreqCellList                   InterFreqCellList-LCR-r4-ext        OPTIONAL
}

InterFreqMeasQuantity ::=           SEQUENCE {
    reportingCriteria                   CHOICE {
        intraFreqReportingCriteria          SEQUENCE {
            intraFreqMeasQuantity               IntraFreqMeasQuantity
        },
        interFreqReportingCriteria          SEQUENCE {
            filterCoefficient                   FilterCoefficient           DEFAULT fc0,
            modeSpecificInfo                    CHOICE {
                fdd                                 SEQUENCE {
                    freqQualityEstimateQuantity-FDD     FreqQualityEstimateQuantity-FDD
                },
                tdd                                 SEQUENCE {
                    freqQualityEstimateQuantity-TDD     FreqQualityEstimateQuantity-TDD
                }
            }
        }
    }
}

InterFreqMeasuredResults ::=        SEQUENCE {
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    utra-CarrierRSSI                    UTRA-CarrierRSSI                    OPTIONAL,
    interFreqCellMeasuredResultsList    InterFreqCellMeasuredResultsList    OPTIONAL
}

InterFreqMeasuredResultsList ::=    SEQUENCE (SIZE (1..maxFreq)) OF
                                        InterFreqMeasuredResults


InterFreqMeasurementSysInfo-RSCP ::=    SEQUENCE {
    interFreqCellInfoSI-List                InterFreqCellInfoSI-List-RSCP       OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0 ::=        SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-ECN0       OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP ::=        SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-HCS-RSCP   OPTIONAL
}
```

```
InterFreqMeasurementSysInfo-HCS-ECN0 ::=        SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-HCS-ECN0   OPTIONAL
}

InterFreqMeasurementSysInfo-RSCP-LCR-r4 ::= SEQUENCE {
    interFreqCellInfoSI-List                InterFreqCellInfoSI-List-RSCP-LCR       OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0-LCR-r4 ::=     SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-ECN0-LCR       OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP-LCR-r4 ::=     SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-HCS-RSCP-LCR   OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-ECN0-LCR-r4 ::=     SEQUENCE {
    interFreqCellInfoSI-List            InterFreqCellInfoSI-List-HCS-ECN0-LCR   OPTIONAL
}

InterFreqReportCriteria ::=         CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria,
    interFreqReportingCriteria          InterFreqReportingCriteria,
    periodicalReportingCriteria         PeriodicalWithReportingCellStatus,
    noReporting                         ReportingCellStatusOpt
}

InterFreqReportCriteria-r4 ::=      CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria-r4,
    interFreqReportingCriteria          InterFreqReportingCriteria,
    periodicalReportingCriteria         PeriodicalWithReportingCellStatus,
    noReporting                         ReportingCellStatusOpt
}

InterFreqReportingCriteria ::=      SEQUENCE {
    interFreqEventList                  InterFreqEventList                  OPTIONAL
}

InterFreqReportingQuantity ::=      SEQUENCE {
    utra-Carrier-RSSI                   BOOLEAN,
    frequencyQualityEstimate            BOOLEAN,
    nonFreqRelatedQuantities            CellReportingQuantities
}

InterFrequencyMeasurement ::=       SEQUENCE {
    interFreqCellInfoList               InterFreqCellInfoList,
    interFreqMeasQuantity               InterFreqMeasQuantity               OPTIONAL,
    interFreqReportingQuantity          InterFreqReportingQuantity          OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    interFreqSetUpdate                  UE-AutonomousUpdateMode             OPTIONAL,
    reportCriteria                      InterFreqReportCriteria
}

InterFrequencyMeasurement-r4 ::=    SEQUENCE {
    interFreqCellInfoList               InterFreqCellInfoList-r4,
    interFreqMeasQuantity               InterFreqMeasQuantity               OPTIONAL,
    interFreqReportingQuantity          InterFreqReportingQuantity          OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    interFreqSetUpdate                  UE-AutonomousUpdateMode             OPTIONAL,
    reportCriteria                      InterFreqReportCriteria-r4
}

InterRAT-TargetCellDescription::=   SEQUENCE {
    technologySpecificInfo              CHOICE {
        gsm                                 SEQUENCE {
            bsic                                BSIC,
            frequency-band                      Frequency-Band,
            bcch-ARFCN                          BCCH-ARFCN,
            ncMode                              NC-Mode             OPTIONAL
        },
        is-2000                             NULL,
        spare                               NULL
    }
}

InterRATCellID ::=              INTEGER (0..maxCellMeas-1)
```

```
InterRATCellInfoList ::=            SEQUENCE {
    removedInterRATCellList         RemovedInterRATCellList,
    newInterRATCellList             NewInterRATCellList,
    -- NOTE: Future revisions of dedicated message(s) including IE newInterRATCellList
    -- should use a corrected version of this IE
    cellsForInterRATMeasList            CellsForInterRATMeasList            OPTIONAL
}

InterRATCellInfoList-B ::=          SEQUENCE {
    removedInterRATCellList         RemovedInterRATCellList,
    newInterRATCellList             NewInterRATCellList-B
    -- NOTE: IE newInterRATCellList should be optional.
    -- However, system information does not support message versions
    -- Hence, this can not be corrected
}

InterRATCellInfoList-r4 ::=         SEQUENCE {
    removedInterRATCellList                 RemovedInterRATCellList,
    newInterRATCellList                     NewInterRATCellList                 OPTIONAL,
    cellsForInterRATMeasList                CellsForInterRATMeasList            OPTIONAL
}

InterRATCellIndividualOffset ::=            INTEGER (-50..50)

InterRATEvent ::=               CHOICE {
    event3a                             Event3a,
    event3b                             Event3b,
    event3c                             Event3c,
    event3d                             Event3d
}

InterRATEventList ::=           SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                    InterRATEvent

InterRATEventResults ::=            SEQUENCE {
    eventID                             EventIDInterRAT,
    cellToReportList                    CellToReportList
}

InterRATInfo ::=                    ENUMERATED {
                                        gsm }

InterRATMeasQuantity ::=                SEQUENCE {
    measQuantityUTRAN-QualityEstimate       IntraFreqMeasQuantity           OPTIONAL,
    ratSpecificInfo                     CHOICE {
        gsm                                     SEQUENCE {
            measurementQuantity                     MeasurementQuantityGSM,
            filterCoefficient                       FilterCoefficient       DEFAULT fc0,
            bsic-VerificationRequired               BSIC-VerificationRequired
        },
        is-2000                                 SEQUENCE {
            tadd-EcIo                               INTEGER (0..63),
            tcomp-EcIo                              INTEGER (0..15),
            softSlope                               INTEGER (0..63)         OPTIONAL,
            addIntercept                            INTEGER (0..63)         OPTIONAL
        }
    }
}

InterRATMeasuredResults ::=     CHOICE {
    gsm                                 GSM-MeasuredResultsList,
    spare                               NULL
}

InterRATMeasuredResultsList ::= SEQUENCE (SIZE (1..maxOtherRAT)) OF
                                    InterRATMeasuredResults

InterRATMeasurement ::=         SEQUENCE {
    interRATCellInfoList                InterRATCellInfoList                OPTIONAL,
    interRATMeasQuantity                InterRATMeasQuantity                OPTIONAL,
    interRATReportingQuantity           InterRATReportingQuantity       OPTIONAL,
    reportCriteria                      InterRATReportCriteria
}

InterRATMeasurement-r4 ::=          SEQUENCE {
    interRATCellInfoList                InterRATCellInfoList-r4             OPTIONAL,
    interRATMeasQuantity                InterRATMeasQuantity                OPTIONAL,
    interRATReportingQuantity           InterRATReportingQuantity       OPTIONAL,
```

```
	reportCriteria						InterRATReportCriteria
}

InterRATMeasurementSysInfo ::=	SEQUENCE {
	interRATCellInfoList				InterRATCellInfoList				OPTIONAL
}

InterRATMeasurementSysInfo-B ::=	SEQUENCE {
	interRATCellInfoList				InterRATCellInfoList-B			OPTIONAL
}

InterRATReportCriteria ::=		CHOICE {
	interRATReportingCriteria			InterRATReportingCriteria,
	periodicalReportingCriteria			PeriodicalWithReportingCellStatus,
	noReporting							ReportingCellStatusOpt
}

InterRATReportingCriteria ::=	SEQUENCE {
	interRATEventList				InterRATEventList				OPTIONAL
}

InterRATReportingQuantity ::=	SEQUENCE {
	utran-EstimatedQuality				BOOLEAN,
	ratSpecificInfo					CHOICE {
		gsm								SEQUENCE {
			dummy							BOOLEAN,
			observedTimeDifferenceGSM		BOOLEAN,
			gsm-Carrier-RSSI				BOOLEAN
		}
	}
}

IntraFreqCellID ::=					INTEGER (0..maxCellMeas-1)

IntraFreqCellInfoList ::=			SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellList				OPTIONAL,
	cellsForIntraFreqMeasList			CellsForIntraFreqMeasList			OPTIONAL
}

IntraFreqCellInfoList-r4 ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellList-r4			OPTIONAL
}

IntraFreqCellInfoSI-List-RSCP ::=	SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-RSCP
}

IntraFreqCellInfoSI-List-ECN0 ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-ECN0
}

IntraFreqCellInfoSI-List-HCS-RSCP ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-HCS-RSCP
}

IntraFreqCellInfoSI-List-HCS-ECN0 ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-HCS-ECN0
}

IntraFreqCellInfoSI-List-RSCP-LCR-r4 ::=	SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-RSCP-LCR-r4
}

IntraFreqCellInfoSI-List-ECN0-LCR-r4 ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-ECN0-LCR-r4
}

IntraFreqCellInfoSI-List-HCS-RSCP-LCR-r4 ::=		SEQUENCE {
	removedIntraFreqCellList			RemovedIntraFreqCellList			OPTIONAL,
	newIntraFreqCellList				NewIntraFreqCellSI-List-HCS-RSCP-LCR-r4
```

```
}

IntraFreqCellInfoSI-List-HCS-ECN0-LCR-r4 ::=        SEQUENCE {
    removedIntraFreqCellList            RemovedIntraFreqCellList            OPTIONAL,
    newIntraFreqCellList                NewIntraFreqCellSI-List-HCS-ECN0-LCR-r4
}

IntraFreqEvent ::=                  CHOICE {
    e1a                                 Event1a,
    e1b                                 Event1b,
    e1c                                 Event1c,
    e1d                                 NULL,
    e1e                                 Event1e,
    e1f                                 Event1f,
    e1g                                 NULL,
    e1h                                 ThresholdUsedFrequency,
    e1i                                 ThresholdUsedFrequency
}

IntraFreqEvent-r4 ::=               CHOICE {
    e1a                                 Event1a-r4,
    e1b                                 Event1b-r4,
    e1c                                 Event1c,
    e1d                                 NULL,
    e1e                                 Event1e,
    e1f                                 Event1f,
    e1g                                 NULL,
    e1h                                 ThresholdUsedFrequency,
    e1i                                 ThresholdUsedFrequency
}

IntraFreqEvent-LCR-r4 ::=           CHOICE {
    e1a                                 Event1a-LCR-r4,
    e1b                                 Event1b-LCR-r4,
    e1c                                 Event1c,
    e1d                                 NULL,
    e1e                                 Event1e,
    e1f                                 Event1f,
    e1g                                 NULL,
    e1h                                 ThresholdUsedFrequency,
    e1i                                 ThresholdUsedFrequency
}

IntraFreqEventCriteria ::=          SEQUENCE {
    event                               IntraFreqEvent,
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

IntraFreqEventCriteria-r4 ::=       SEQUENCE {
    event                               IntraFreqEvent-r4,
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

IntraFreqEventCriteria-LCR-r4 ::=   SEQUENCE {
    event                               IntraFreqEvent-LCR-r4,
    hysteresis                          Hysteresis,
    timeToTrigger                       TimeToTrigger,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}

IntraFreqEventCriteriaList ::=      SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        IntraFreqEventCriteria

IntraFreqEventCriteriaList-r4 ::=   SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        IntraFreqEventCriteria-r4

IntraFreqEventCriteriaList-LCR-r4 ::=   SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        IntraFreqEventCriteria-LCR-r4

IntraFreqEventResults ::=           SEQUENCE {
    eventID                             EventIDIntraFreq,
    cellMeasurementEventResults         CellMeasurementEventResults
}
```

```
IntraFreqMeasQuantity ::=           SEQUENCE {
    filterCoefficient                   FilterCoefficient                   DEFAULT fc0,
    modeSpecificInfo                    CHOICE {
        fdd                             SEQUENCE {
            intraFreqMeasQuantity-FDD       IntraFreqMeasQuantity-FDD
        },
        tdd                             SEQUENCE {
            intraFreqMeasQuantity-TDDList   IntraFreqMeasQuantity-TDDList
        }
    }
}

IntraFreqMeasQuantity-FDD ::=       ENUMERATED {
                                        cpich-Ec-N0,
                                        cpich-RSCP,
                                        pathloss,
                                        utra-CarrierRSSI }
-- If used in InterRATMeasQuantity only cpich-Ec-N0 and cpich-RSCP is
-- allowed.
-- If used in InterFreqMeasQuantity utra-CarrierRSSI is not allowed.
IntraFreqMeasQuantity-TDD ::=       ENUMERATED {
                                        primaryCCPCH-RSCP,
                                        pathloss,
                                        timeslotISCP,
                                        utra-CarrierRSSI }
-- If used in InterFreqMeasQuantity utra-CarrierRSSI is not allowed.
IntraFreqMeasQuantity-TDDList ::=   SEQUENCE (SIZE (1..4)) OF
                                        IntraFreqMeasQuantity-TDD

IntraFreqMeasuredResultsList ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        CellMeasuredResults

IntraFreqMeasurementSysInfo-RSCP ::=    SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-RSCP       OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH             OPTIONAL
}

IntraFreqMeasurementSysInfo-ECN0 ::=        SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-ECN0       OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH             OPTIONAL
}

IntraFreqMeasurementSysInfo-HCS-RSCP ::=    SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-HCS-RSCP   OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH             OPTIONAL
}

IntraFreqMeasurementSysInfo-HCS-ECN0 ::=    SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-HCS-ECN0   OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH             OPTIONAL
}

IntraFreqMeasurementSysInfo-RSCP-LCR-r4 ::= SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-RSCP-LCR-r4    OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH-LCR-r4      OPTIONAL
}

IntraFreqMeasurementSysInfo-ECN0-LCR-r4 ::=     SEQUENCE {
```

```
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-ECN0-LCR-r4    OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH-LCR-r4      OPTIONAL
}

IntraFreqMeasurementSysInfo-HCS-RSCP-LCR-r4 ::= SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-HCS-RSCP-LCR-r4    OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH-LCR-r4      OPTIONAL
}

IntraFreqMeasurementSysInfo-HCS-ECN0-LCR-r4 ::= SEQUENCE {
    intraFreqMeasurementID              MeasurementIdentity         DEFAULT 1,
    intraFreqCellInfoSI-List            IntraFreqCellInfoSI-List-HCS-ECN0-LCR-r4    OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantityForRACH   IntraFreqReportingQuantityForRACH   OPTIONAL,
    maxReportedCellsOnRACH              MaxReportedCellsOnRACH              OPTIONAL,
    reportingInfoForCellDCH             ReportingInfoForCellDCH-LCR-r4      OPTIONAL
}

IntraFreqReportCriteria ::=         CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria,
    periodicalReportingCriteria         PeriodicalWithReportingCellStatus,
    noReporting                         ReportingCellStatusOpt
}

IntraFreqReportCriteria-r4 ::=      CHOICE {
    intraFreqReportingCriteria          IntraFreqReportingCriteria-r4,
    periodicalReportingCriteria         PeriodicalWithReportingCellStatus,
    noReporting                         ReportingCellStatusOpt
}

IntraFreqReportingCriteria ::=      SEQUENCE {
    eventCriteriaList                   IntraFreqEventCriteriaList      OPTIONAL
}

IntraFreqReportingCriteria-r4 ::=   SEQUENCE {
    eventCriteriaList                   IntraFreqEventCriteriaList-r4   OPTIONAL
}

IntraFreqReportingCriteria-LCR-r4 ::=   SEQUENCE {
    eventCriteriaList                   IntraFreqEventCriteriaList-LCR-r4   OPTIONAL
}

IntraFreqReportingQuantity ::=      SEQUENCE {
    activeSetReportingQuantities        CellReportingQuantities,
    monitoredSetReportingQuantities     CellReportingQuantities,
    detectedSetReportingQuantities      CellReportingQuantities             OPTIONAL
}

IntraFreqReportingQuantityForRACH ::= SEQUENCE {
    sfn-SFN-OTD-Type                    SFN-SFN-OTD-Type,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            intraFreqRepQuantityRACH-FDD        IntraFreqRepQuantityRACH-FDD
        },
        tdd                                 SEQUENCE {
            intraFreqRepQuantityRACH-TDDList    IntraFreqRepQuantityRACH-TDDList
        }
    }
}

IntraFreqRepQuantityRACH-FDD ::=    ENUMERATED {
                                        cpich-EcN0, cpich-RSCP,
                                        pathloss, noReport }

IntraFreqRepQuantityRACH-TDD ::=    ENUMERATED {
                                        timeslotISCP,
                                        primaryCCPCH-RSCP,
                                        noReport }

IntraFreqRepQuantityRACH-TDDList ::= SEQUENCE (SIZE (1..2)) OF
```

```
                                    IntraFreqRepQuantityRACH-TDD

IntraFrequencyMeasurement ::=       SEQUENCE {
    intraFreqCellInfoList               IntraFreqCellInfoList               OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantity          IntraFreqReportingQuantity          OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    reportCriteria                      IntraFreqReportCriteria             OPTIONAL
}

IntraFrequencyMeasurement-r4 ::=    SEQUENCE {
    intraFreqCellInfoList               IntraFreqCellInfoList-r4            OPTIONAL,
    intraFreqMeasQuantity               IntraFreqMeasQuantity               OPTIONAL,
    intraFreqReportingQuantity          IntraFreqReportingQuantity          OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    reportCriteria                      IntraFreqReportCriteria-r4          OPTIONAL
}

IODE ::=                            INTEGER (0..255)

IP-Length ::=                       ENUMERATED {
                                        ipl5, ipl10 }

IP-PCCPCH-r4 ::=                    BOOLEAN

IP-Spacing ::=                      ENUMERATED {
                                        e5, e7, e10, e15, e20,
                                        e30, e40, e50 }

IP-Spacing-TDD ::=                      ENUMERATED {
                                        e30, e40, e50, e70, e100}

IS-2000SpecificMeasInfo ::=         ENUMERATED {
                                        frequency, timeslot, colourcode,
                                        outputpower, pn-Offset }

MaxNumberOfReportingCellsType1 ::=  ENUMERATED {
                                        e1, e2, e3, e4, e5, e6}

MaxNumberOfReportingCellsType2 ::=  ENUMERATED {
                                        e1, e2, e3, e4, e5, e6, e7, e8, e9, e10, e11, e12}

MaxNumberOfReportingCellsType3 ::=  ENUMERATED {
                                        viactCellsPlus1,
                                        viactCellsPlus2,
                                        viactCellsPlus3,
                                        viactCellsPlus4,
                                        viactCellsPlus5,
                                        viactCellsPlus6 }

MaxReportedCellsOnRACH ::=          ENUMERATED {
                                        noReport,
                                        currentCell,
                                        currentAnd-1-BestNeighbour,
                                        currentAnd-2-BestNeighbour,
                                        currentAnd-3-BestNeighbour,
                                        currentAnd-4-BestNeighbour,
                                        currentAnd-5-BestNeighbour,
                                        currentAnd-6-BestNeighbour }

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

MeasuredResultsOnRACH ::=           SEQUENCE {
    currentCell                         SEQUENCE {
        modeSpecificInfo                    CHOICE {
            fdd                                 SEQUENCE {
                measurementQuantity                 CHOICE {
                    cpich-Ec-N0                         CPICH-Ec-N0,
                    cpich-RSCP                          CPICH-RSCP,
                    pathloss                            Pathloss
                }
            },
            tdd                                 SEQUENCE {
                timeslotISCP                        TimeslotISCP-List       OPTIONAL,
                primaryCCPCH-RSCP                   PrimaryCCPCH-RSCP       OPTIONAL
            }
        }
    },
    monitoredCells                      MonitoredCellRACH-List              OPTIONAL
}

MeasurementCommand ::=              CHOICE {
    setup                               MeasurementType,
    modify                              SEQUENCE {
        measurementType                     MeasurementType                 OPTIONAL
    },
    release                             NULL
}

MeasurementCommand-r4 ::=           CHOICE {
    setup                               MeasurementType-r4,
    modify                              SEQUENCE {
        measurementType                     MeasurementType-r4              OPTIONAL
    },
    release                             NULL
}

MeasurementControlSysInfo ::=       SEQUENCE {
    use-of-HCS                          CHOICE  {
        hcs-not-used                    SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-RSCP    OPTIONAL
                },
                cpich-Ec-N0             SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-ECN0    OPTIONAL
                }
            },
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo-B        OPTIONAL
        },
        hcs-used                        SEQUENCE    {
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-RSCP
    OPTIONAL
                },
                cpich-Ec-N0             SEQUENCE    {
                    intraFreqMeasurementSysInfo         IntraFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL,
                    interFreqMeasurementSysInfo         InterFreqMeasurementSysInfo-HCS-ECN0
    OPTIONAL                }
            },
```

```
            interRATMeasurementSysInfo      InterRATMeasurementSysInfo      OPTIONAL
        }
    },

    trafficVolumeMeasSysInfo            TrafficVolumeMeasSysInfo            OPTIONAL,
    ue-InternalMeasurementSysInfo       UE-InternalMeasurementSysInfo       OPTIONAL
}

MeasurementControlSysInfo-LCR-r4-ext ::=    SEQUENCE {
-- The following CHOICE shall have the same value as the use-of-HCS in MeasurementControlSysInfo
    use-of-HCS                          CHOICE  {
        hcs-not-used                    SEQUENCE    {
-- The following CHOICE shall have the same value as the cellSelectQualityMeasure in
-- MeasurementControlSysInfo
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo IntraFreqMeasurementSysInfo-RSCP-LCR-r4 OPTIONAL,
                    interFreqMeasurementSysInfo InterFreqMeasurementSysInfo-RSCP-LCR-r4 OPTIONAL
                },
                cpich-Ec-N0             SEQUENCE    {
                    intraFreqMeasurementSysInfo IntraFreqMeasurementSysInfo-ECN0-LCR-r4 OPTIONAL,
                    interFreqMeasurementSysInfo InterFreqMeasurementSysInfo-ECN0-LCR-r4 OPTIONAL
                }
            }
        },
        hcs-used                        SEQUENCE    {
-- The following CHOICE shall have the same value as the cellSelectQualityMeasure in
-- MeasurementControlSysInfo
            cellSelectQualityMeasure    CHOICE  {
                cpich-RSCP              SEQUENCE    {
                    intraFreqMeasurementSysInfo IntraFreqMeasurementSysInfo-HCS-RSCP-LCR-r4
    OPTIONAL,
                    interFreqMeasurementSysInfo InterFreqMeasurementSysInfo-HCS-RSCP-LCR-r4 OPTIONAL
                },
                cpich-Ec-N0             SEQUENCE    {
                    intraFreqMeasurementSysInfo IntraFreqMeasurementSysInfo-HCS-ECN0-LCR-r4
    OPTIONAL,
                    interFreqMeasurementSysInfo InterFreqMeasurementSysInfo-HCS-ECN0-LCR-r4 OPTIONAL
                }
            }
        }
    }
}

MeasurementIdentity ::=     INTEGER (1..16)

MeasurementQuantityGSM ::=          ENUMERATED {
                                        gsm-CarrierRSSI,
                                        dummy }

MeasurementReportingMode ::=        SEQUENCE {
    measurementReportTransferMode       TransferMode,
    periodicalOrEventTrigger            PeriodicalOrEventTrigger
}

MeasurementType ::=                 CHOICE {
    intraFrequencyMeasurement           IntraFrequencyMeasurement,
    interFrequencyMeasurement           InterFrequencyMeasurement,
    interRATMeasurement             InterRATMeasurement,
    ue-positioning-Measurement                      UE-Positioning-Measurement,
    trafficVolumeMeasurement            TrafficVolumeMeasurement,
    qualityMeasurement                  QualityMeasurement,
    ue-InternalMeasurement              UE-InternalMeasurement
}

MeasurementType-r4 ::=              CHOICE {
    intraFrequencyMeasurement           IntraFrequencyMeasurement-r4,
    interFrequencyMeasurement           InterFrequencyMeasurement-r4,
    interRATMeasurement             InterRATMeasurement-r4,
    up-Measurement                      UE-Positioning-Measurement-r4,
    trafficVolumeMeasurement            TrafficVolumeMeasurement,
    qualityMeasurement                  QualityMeasurement,
    ue-InternalMeasurement              UE-InternalMeasurement-r4
}

MeasurementValidity ::=             SEQUENCE {
    ue-State                            ENUMERATED {
                                            cell-DCH, all-But-Cell-DCH, all-States }
```

```
}

MonitoredCellRACH-List ::=          SEQUENCE (SIZE (1..7)) OF
                                        MonitoredCellRACH-Result

MonitoredCellRACH-Result ::=        SEQUENCE {
    sfn-SFN-ObsTimeDifference           SFN-SFN-ObsTimeDifference           OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            primaryCPICH-Info                   PrimaryCPICH-Info,
            measurementQuantity                 CHOICE {
                cpich-Ec-N0                         CPICH-Ec-N0,
                cpich-RSCP                          CPICH-RSCP,
                pathloss                            Pathloss
            }                                                               OPTIONAL
        },
        tdd                                 SEQUENCE {
            cellParametersID                    CellParametersID,
            primaryCCPCH-RSCP                   PrimaryCCPCH-RSCP
        }
    }
}

MultipathIndicator ::=              ENUMERATED {
                                        nm,
                                        low,
                                        medium,
                                        high }

N-CR-T-CRMaxHyst ::=                SEQUENCE {
    n-CR                                INTEGER (1..16)                     DEFAULT 8,
    t-CRMaxHyst                         T-CRMaxHyst
}

NavigationModelSatInfo ::=          SEQUENCE {
    satID                               SatID,
    satelliteStatus                     SatelliteStatus,
    ephemerisParameter                  EphemerisParameter      OPTIONAL
}

NavigationModelSatInfoList ::=      SEQUENCE (SIZE (1..maxSat)) OF
                                        NavigationModelSatInfo

EphemerisParameter ::=                      SEQUENCE {
    codeOnL2                            BIT STRING (SIZE (2)),
    uraIndex                            BIT STRING (SIZE (4)),
    satHealth                           BIT STRING (SIZE (6)),
    iodc                                BIT STRING (SIZE (10)),
    l2Pflag                             BIT STRING (SIZE (1)),
    sf1Revd                             SubFrame1Reserved,
    t-GD                                BIT STRING (SIZE (8)),
    t-oc                                BIT STRING (SIZE (16)),
    af2                                 BIT STRING (SIZE (8)),
    af1                                 BIT STRING (SIZE (16)),
    af0                                 BIT STRING (SIZE (22)),
    c-rs                                BIT STRING (SIZE (16)),
    delta-n                             BIT STRING (SIZE (16)),
    m0                                  BIT STRING (SIZE (32)),
    c-uc                                BIT STRING (SIZE (16)),
    e                                   BIT STRING (SIZE (32)),
    c-us                                BIT STRING (SIZE (16)),
    a-Sqrt                              BIT STRING (SIZE (32)),
    t-oe                                BIT STRING (SIZE (16)),
    fitInterval                         BIT STRING (SIZE (1)),
    aodo                                BIT STRING (SIZE (5)),
    c-ic                                BIT STRING (SIZE (16)),
    omega0                              BIT STRING (SIZE (32)),
    c-is                                BIT STRING (SIZE (16)),
    i0                                  BIT STRING (SIZE (32)),
    c-rc                                BIT STRING (SIZE (16)),
    omega                               BIT STRING (SIZE (32)),
    omegaDot                            BIT STRING (SIZE (24)),
    iDot                                BIT STRING (SIZE (14))
}
NC-Mode::=                          BIT STRING (SIZE (3))

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}

Neighbour-v390ext ::=                       SEQUENCE {
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            frequencyInfo                       FrequencyInfo
        },
        tdd                             NULL
    }
}

NeighbourList ::=                   SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        Neighbour

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

NeighbourQuality ::=                SEQUENCE {
    ue-Positioning-OTDOA-Quality        UE-Positioning-OTDOA-Quality
}

NewInterFreqCell ::=                SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfo
}

NewInterFreqCell-r4 ::=             SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfo-r4
}

NewInterFreqCellList ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCell

NewInterFreqCellList-r4 ::=         SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCell-r4

NewInterFreqCellSI-RSCP ::=             SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-RSCP
}

NewInterFreqCellSI-ECN0 ::=             SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-ECN0
}

NewInterFreqCellSI-HCS-RSCP ::=             SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-HCS-RSCP
}

NewInterFreqCellSI-HCS-ECN0 ::=             SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-HCS-ECN0
}

NewInterFreqCellSI-RSCP-LCR-r4 ::=          SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-RSCP-LCR-r4
```

```
}

NewInterFreqCellSI-ECN0-LCR-r4 ::=          SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-ECN0-LCR-r4
}

NewInterFreqCellSI-HCS-RSCP-LCR-r4 ::=      SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-HCS-RSCP-LCR-r4
}

NewInterFreqCellSI-HCS-ECN0-LCR-r4 ::=      SEQUENCE {
    interFreqCellID                     InterFreqCellID                     OPTIONAL,
    frequencyInfo                       FrequencyInfo                       OPTIONAL,
    cellInfo                            CellInfoSI-HCS-ECN0-LCR-r4
}

NewInterFreqCellSI-List-ECN0 ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-ECN0

NewInterFreqCellSI-List-HCS-RSCP ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-HCS-RSCP

NewInterFreqCellSI-List-HCS-ECN0 ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-HCS-ECN0

NewInterFreqCellSI-List-RSCP ::=        SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-RSCP

NewInterFreqCellSI-List-ECN0-LCR-r4 ::=     SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-ECN0-LCR-r4

NewInterFreqCellSI-List-HCS-RSCP-LCR-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-HCS-RSCP-LCR-r4

NewInterFreqCellSI-List-HCS-ECN0-LCR-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-HCS-ECN0-LCR-r4

NewInterFreqCellSI-List-RSCP-LCR-r4 ::=     SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterFreqCellSI-RSCP-LCR-r4

NewInterRATCell ::=             SEQUENCE {
    interRATCellID                      InterRATCellID          OPTIONAL,
    technologySpecificInfo              CHOICE {
        gsm                                 SEQUENCE {
            cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12     OPTIONAL,
            interRATCellIndividualOffset        InterRATCellIndividualOffset,
            bsic                                BSIC,
            frequency-band                      Frequency-Band,
            bcch-ARFCN                          BCCH-ARFCN,
            dummy                               NULL                OPTIONAL
        },
        is-2000                             SEQUENCE {
            is-2000SpecificMeasInfo             IS-2000SpecificMeasInfo
        },
        none                                NULL,
        -- ASN.1 inconsistency: NewInterRATCellList should be optional within
        -- InterRATCellInfoList. The UE shall consider IE NewInterRATCell with
        -- technologySpecificInfo set to “none” as valid and handle the
        -- message as if the IE NewInterRATCell was absent
        spare1                              NULL
    }
}

NewInterRATCell-B ::=               SEQUENCE {
    interRATCellID                      InterRATCellID              OPTIONAL,
    technologySpecificInfo              CHOICE {
        gsm                                 SEQUENCE {
            cellSelectionReselectionInfo        CellSelectReselectInfoSIB-11-12     OPTIONAL,
            interRATCellIndividualOffset        InterRATCellIndividualOffset,
            bsic                                BSIC,
            frequency-band                      Frequency-Band,
            bcch-ARFCN                          BCCH-ARFCN,
            dummy                               NULL                OPTIONAL
        },
```

```
        is-2000                             SEQUENCE {
            is-2000SpecificMeasInfo             IS-2000SpecificMeasInfo
        },
        none                                NULL,
        -- ASN.1 inconsistency: NewInterRATCellList-B should be optional within
        -- InterRATCellInfoList-B. The UE shall consider IE NewInterRATCell-B with
        -- technologySpecificInfo set to "none" as valid and handle the
        -- message as if the IE NewInterRATCell-B was absent
        spare1                              NULL
    }
}

NewInterRATCellList ::=         SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterRATCell

NewInterRATCellList-B ::=           SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewInterRATCell-B

NewIntraFreqCell ::=                SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfo
}

NewIntraFreqCell-r4 ::=             SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfo-r4
}

NewIntraFreqCellList ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCell

NewIntraFreqCellList-r4 ::=         SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCell-r4

NewIntraFreqCellSI-RSCP ::=             SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-RSCP
}

NewIntraFreqCellSI-ECN0 ::=         SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-ECN0
}
NewIntraFreqCellSI-HCS-RSCP ::=     SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-HCS-RSCP
}

NewIntraFreqCellSI-HCS-ECN0 ::=     SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-HCS-ECN0
}

NewIntraFreqCellSI-RSCP-LCR-r4 ::=      SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-RSCP-LCR-r4
}

NewIntraFreqCellSI-ECN0-LCR-r4 ::=      SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-ECN0-LCR-r4
}
NewIntraFreqCellSI-HCS-RSCP-LCR-r4 ::=  SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-HCS-RSCP-LCR-r4
}

NewIntraFreqCellSI-HCS-ECN0-LCR-r4 ::=  SEQUENCE {
    intraFreqCellID                     IntraFreqCellID                     OPTIONAL,
    cellInfo                            CellInfoSI-HCS-ECN0-LCR-r4
}

NewIntraFreqCellSI-List-RSCP ::=        SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            NewIntraFreqCellSI-RSCP

NewIntraFreqCellSI-List-ECN0 ::=        SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-ECN0
```

```
NewIntraFreqCellSI-List-HCS-RSCP ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-HCS-RSCP

NewIntraFreqCellSI-List-HCS-ECN0 ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-HCS-ECN0

NewIntraFreqCellSI-List-RSCP-LCR-r4 ::=     SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            NewIntraFreqCellSI-RSCP-LCR-r4

NewIntraFreqCellSI-List-ECN0-LCR-r4 ::=     SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-ECN0-LCR-r4

NewIntraFreqCellSI-List-HCS-RSCP-LCR-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-HCS-RSCP-LCR-r4

NewIntraFreqCellSI-List-HCS-ECN0-LCR-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                        NewIntraFreqCellSI-HCS-ECN0-LCR-r4

NonUsedFreqParameter ::=            SEQUENCE {
    nonUsedFreqThreshold                Threshold,
    -- IE “nonUsedFreqThreshold” is not needed in case of event 2a
    -- In case of event 2a UTRAN should include value 0 within IE “nonUsedFreqThreshold”
    -- In case of event 2a, the UE shall be ignore IE “nonUsedFreqThreshold”
    -- In later versions of the message including this IE, a special version of
    -- IE “NonUsedFreqParameterList” may be defined for event 2a, namely a
    -- version not including IE “nonUsedFreqThreshold”
    nonUsedFreqW                        W
}

NonUsedFreqParameterList ::=        SEQUENCE (SIZE (1..maxFreq)) OF
                                        NonUsedFreqParameter

ObservedTimeDifferenceToGSM ::=     INTEGER (0..4095)

OTDOA-SearchWindowSize ::=          ENUMERATED {
                                        c20, c40, c80, c160, c320,
                                        c640, c1280, moreThan1280 }

Pathloss ::=                        INTEGER (46..158)

PenaltyTime-RSCP ::=                CHOICE {
    notUsed                             NULL,
    pt10                                TemporaryOffset1,
    pt20                                TemporaryOffset1,
    pt30                                TemporaryOffset1,
    pt40                                TemporaryOffset1,
    pt50                                TemporaryOffset1,
    pt60                                TemporaryOffset1
}

PenaltyTime-ECN0 ::=                CHOICE {
    notUsed                             NULL,
    pt10                                TemporaryOffsetList,
    pt20                                TemporaryOffsetList,
    pt30                                TemporaryOffsetList,
    pt40                                TemporaryOffsetList,
    pt50                                TemporaryOffsetList,
    pt60                                TemporaryOffsetList
}

PendingTimeAfterTrigger ::=         ENUMERATED {
                                        ptat0-25, ptat0-5, ptat1,
                                        ptat2, ptat4, ptat8, ptat16 }

PeriodicalOrEventTrigger ::=        ENUMERATED {
                                        periodical,
                                        eventTrigger }

PeriodicalReportingCriteria ::=     SEQUENCE {
    reportingAmount                     ReportingAmount                 DEFAULT ra-Infinity,
    reportingInterval                   ReportingIntervalLong
}

PeriodicalWithReportingCellStatus ::= SEQUENCE {
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    reportingCellStatus                 ReportingCellStatus                 OPTIONAL
}
```

```
PLMNIdentitiesOfNeighbourCells ::=  SEQUENCE {
        plmnsOfIntraFreqCellsList       PLMNsOfIntraFreqCellsList           OPTIONAL,
        plmnsOfInterFreqCellsList       PLMNsOfInterFreqCellsList           OPTIONAL,
        plmnsOfInterRATCellsList        PLMNsOfInterRATCellsList            OPTIONAL
}

PLMNsOfInterFreqCellsList ::=           SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            SEQUENCE {
    plmn-Identity                               PLMN-Identity               OPTIONAL
}

PLMNsOfIntraFreqCellsList ::=           SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            SEQUENCE {
    plmn-Identity                               PLMN-Identity               OPTIONAL
}

PLMNsOfInterRATCellsList ::=            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            SEQUENCE {
    plmn-Identity                               PLMN-Identity               OPTIONAL
}

PositionEstimate ::=                CHOICE {
    ellipsoidPoint                      EllipsoidPoint,
    ellipsoidPointUncertCircle          EllipsoidPointUncertCircle,
    ellipsoidPointUncertEllipse         EllipsoidPointUncertEllipse,
    ellipsoidPointAltitude              EllipsoidPointAltitude,
    ellipsoidPointAltitudeEllipse       EllipsoidPointAltitudeEllipsoide
}

PositioningMethod ::=               ENUMERATED {
                                        otdoa,
                                        gps,
                                        otdoaOrGPS, cellID }

-- Actual value = IE value * 0.32
PRC ::=                             INTEGER (-2047..2047)


PrimaryCCPCH-RSCP ::=               INTEGER (0..91)

Q-HCS ::=                           INTEGER (0..99)

Q-OffsetS-N ::=                     INTEGER (-50..50)

Q-QualMin ::=                       INTEGER (-24..0)

-- Actual value = (IE value * 2) + 1
Q-RxlevMin ::=                      INTEGER (-58..-13)

QualityEventResults ::=             SEQUENCE (SIZE (1..maxTrCH)) OF
                                        TransportChannelIdentity

QualityMeasuredResults ::=          SEQUENCE {
    blerMeasurementResultsList          BLER-MeasurementResultsList         OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            sir-MeasurementResults              SIR-MeasurementList         OPTIONAL
        }
    }
}

QualityMeasurement ::=              SEQUENCE {
    qualityReportingQuantity            QualityReportingQuantity            OPTIONAL,
    reportCriteria                      QualityReportCriteria
}

QualityReportCriteria ::=           CHOICE {
    qualityReportingCriteria            QualityReportingCriteria,
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    noReporting                         NULL
}

QualityReportingCriteria ::=        SEQUENCE (SIZE (1..maxTrCH)) OF
                                        QualityReportingCriteriaSingle

QualityReportingCriteriaSingle ::=  SEQUENCE {
    transportChannelIdentity            TransportChannelIdentity,
```

```
    totalCRC                            INTEGER (1..512),
    badCRC                              INTEGER (1..512),
    pendingAfterTrigger                 INTEGER (1..512)
}

QualityReportingQuantity ::=        SEQUENCE {
    dl-TransChBLER                      BOOLEAN,
    bler-dl-TransChIdList               BLER-TransChIdList                  OPTIONAL,
    modeSpecificInfo                    CHOICE {
        fdd                                 NULL,
        tdd                                 SEQUENCE {
            sir-TFCS-List                       SIR-TFCS-List               OPTIONAL
        }
    }
}

RAT-Type ::=                        ENUMERATED {
                                        gsm, is2000 }

ReferenceCellPosition ::=           CHOICE {
    ellipsoidPoint                      EllipsoidPoint,
    ellipsoidPointWithAltitude          EllipsoidPointAltitude
}

-- As defined in 23.032
ReferenceLocation ::=           SEQUENCE {
    ellipsoidPointAltitudeEllipsoide        EllipsoidPointAltitudeEllipsoide
}

ReferenceSFN ::=                    INTEGER (0..4095)

ReferenceTimeDifferenceToCell ::=   CHOICE {
    -- Actual value = IE value * 40
    accuracy40                          INTEGER (0..960),
    -- Actual value = IE value * 256
    accuracy256                         INTEGER (0..150),
    -- Actual value = IE value * 2560
    accuracy2560                        INTEGER (0..15)
}

RemovedInterFreqCellList ::=        CHOICE {
    removeAllInterFreqCells             NULL,
    removeSomeInterFreqCells            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            InterFreqCellID,
    removeNoInterFreqCells              NULL
}

RemovedInterRATCellList ::=     CHOICE {
    removeAllInterRATCells          NULL,
    removeSomeInterRATCells         SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            InterRATCellID,
    removeNoInterRATCells           NULL
}

RemovedIntraFreqCellList ::=        CHOICE {
    removeAllIntraFreqCells             NULL,
    removeSomeIntraFreqCells            SEQUENCE (SIZE (1..maxCellMeas)) OF
                                            IntraFreqCellID,
    removeNoIntraFreqCells              NULL
}

ReplacementActivationThreshold ::=  ENUMERATED {
                                        notApplicable, t1, t2,
                                        t3, t4, t5, t6, t7 }

ReportDeactivationThreshold ::=     ENUMERATED {
                                        notApplicable, t1, t2,
                                        t3, t4, t5, t6, t7 }

ReportingAmount ::=                 ENUMERATED {
                                        ra1, ra2, ra4, ra8, ra16, ra32,
                                        ra64, ra-Infinity }

ReportingCellStatus ::=             CHOICE{
    withinActiveSet                     MaxNumberOfReportingCellsType1,
    withinMonitoredSetUsedFreq          MaxNumberOfReportingCellsType1,
    withinActiveAndOrMonitoredUsedFreq  MaxNumberOfReportingCellsType1,
    withinDetectedSetUsedFreq           MaxNumberOfReportingCellsType1,
```

```
    withinMonitoredAndOrDetectedUsedFreq
                                    MaxNumberOfReportingCellsType1,
    allActiveplusMonitoredSet       MaxNumberOfReportingCellsType3,
    allActivePlusDetectedSet        MaxNumberOfReportingCellsType3,
    allActivePlusMonitoredAndOrDetectedSet
                                    MaxNumberOfReportingCellsType3,
    withinVirtualActSet         MaxNumberOfReportingCellsType1,
    withinMonitoredSetNonUsedFreq   MaxNumberOfReportingCellsType1,
    withinMonitoredAndOrVirtualActiveSetNonUsedFreq
                                    MaxNumberOfReportingCellsType1,
    allVirtualActSetplusMonitoredSetNonUsedFreq
                                    MaxNumberOfReportingCellsType3,
    withinActSetOrVirtualActSet-InterRATcells
                                    MaxNumberOfReportingCellsType2,
    withinActSetAndOrMonitoredUsedFreqOrVirtualActSetAndOrMonitoredNonUsedFreq
                                    MaxNumberOfReportingCellsType2
}

ReportingCellStatusOpt ::=      SEQUENCE {
    reportingCellStatus             ReportingCellStatus                 OPTIONAL
}


ReportingInfoForCellDCH ::=     SEQUENCE {
    intraFreqReportingQuantity      IntraFreqReportingQuantity,
    measurementReportingMode        MeasurementReportingMode,
    reportCriteria                  CellDCH-ReportCriteria
}

ReportingInfoForCellDCH-LCR-r4 ::=  SEQUENCE {
    intraFreqReportingQuantity      IntraFreqReportingQuantity,
    measurementReportingMode        MeasurementReportingMode,
    reportCriteria                  CellDCH-ReportCriteria-LCR-r4
}

ReportingInterval ::=           ENUMERATED {
                                    noPeriodicalreporting, ri0-25,
                                    ri0-5, ri1, ri2, ri4, ri8, ri16 }

ReportingIntervalLong ::=       ENUMERATED {
                                    ril0, ril0-25, ril0-5, ril1,
                                    ril2, ril3, ril4, ril6, ril8,
                                    ril12, ril16, ril20, ril24,
                                    ril28, ril32, ril64 }

-- Actual value = IE value * 0.5
ReportingRange ::=              INTEGER (0..29)

RL-AdditionInfoList ::=         SEQUENCE (SIZE (1..maxRL)) OF
                                    PrimaryCPICH-Info

RL-InformationLists ::=         SEQUENCE {
    rl-AdditionInfoList             RL-AdditionInfoList                 OPTIONAL,
    rL-RemovalInformationList       RL-RemovalInformationList           OPTIONAL
}

RLC-BuffersPayload ::=          ENUMERATED {
                                    pl0, pl4, pl8, pl16, pl32, pl64, pl128,
                                    pl256, pl512, pl1024, pl2k, pl4k,
                                    pl8k, pl16k, pl32k, pl64k, pl128k,
                                    pl256k, pl512k, pl1024k }

-- Actual value = IE value * 0.032
RRC ::=                         INTEGER (-127..127)

SatData ::=                     SEQUENCE{
    satID                           SatID,
    iode                            IODE
}

SatDataList ::=                 SEQUENCE (SIZE (0..maxSat)) OF
                                    SatData

SatelliteStatus ::=             ENUMERATED {
                                    ns-NN-U,
                                    es-SN,
                                    es-NN-U,
                                    rev2,
```

```
                                        rev }

SatID ::=                           INTEGER (0..63)

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-100}

SFN-SFN-ObsTimeDifference ::=       CHOICE {
    type1                               SFN-SFN-ObsTimeDifference1,
    type2                               SFN-SFN-ObsTimeDifference2
}

SFN-SFN-ObsTimeDifference1 ::=      INTEGER (0..9830399)

SFN-SFN-ObsTimeDifference2 ::=      INTEGER (0..40961)

SFN-SFN-OTD-Type ::=                ENUMERATED {
                                        noReport,
                                        type1,
                                        type2 }

SFN-SFN-RelTimeDifference1 ::=      SEQUENCE {
    sfn-Offset                          INTEGER (0 .. 4095),
    sfn-sfn-Reltimedifference           INTEGER (0.. 38399)
}

SFN-TOW-Uncertainty ::=             ENUMERATED {
                                        lessThan10,
                                        moreThan10 }

SIR ::=                             INTEGER (0..63)


SIR-MeasurementList ::=             SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        SIR-MeasurementResults


SIR-MeasurementResults ::=          SEQUENCE {
    tfcs-ID                             TFCS-IdentityPlain,
    sir-TimeslotList                    SIR-TimeslotList
}

SIR-TFCS ::=                        TFCS-IdentityPlain


SIR-TFCS-List ::=                   SEQUENCE (SIZE (1..maxCCTrCH)) OF
                                        SIR-TFCS

SIR-TimeslotList ::=                SEQUENCE (SIZE (1..maxTS)) OF
                                        SIR

-- Reserved bits in subframe 1 of the GPS navigation message
SubFrame1Reserved ::=               SEQUENCE {
    reserved1                           BIT STRING (SIZE (23)),
    reserved2                           BIT STRING (SIZE (24)),
    reserved3                           BIT STRING (SIZE (24)),
    reserved4                           BIT STRING (SIZE (16))
}

T-ADVinfo ::=                       SEQUENCE {
                t-ADV                   INTEGER(0..2047),
                sfn                     INTEGER(0..4095)
}

T-CRMax ::=                         CHOICE {
    notUsed                             NULL,
    t30                                 N-CR-T-CRMaxHyst,
    t60                                 N-CR-T-CRMaxHyst,
    t120                                N-CR-T-CRMaxHyst,
```

```
	t180							N-CR-T-CRMaxHyst,
	t240							N-CR-T-CRMaxHyst
}

T-CRMaxHyst ::=						ENUMERATED {
										notUsed, t10, t20, t30,
										t40, t50, t60, t70 }

TemporaryOffset1 ::=				ENUMERATED {
										to3, to6, to9, to12, to15,
										to18, to21, infinite }

TemporaryOffset2 ::=				ENUMERATED {
										to2, to3, to4, to6, to8,
										to10, to12, infinite }

TemporaryOffsetList ::=				SEQUENCE    {
		temporaryOffset1				TemporaryOffset1,
		temporaryOffset2				TemporaryOffset2
}

Threshold ::=						INTEGER (-115..0)

ThresholdPositionChange ::=			ENUMERATED {
										pc10, pc20, pc30, pc40, pc50,
										pc100, pc200, pc300, pc500,
										pc1000, pc2000, pc5000, pc10000,
										pc20000, pc50000, pc100000 }

ThresholdSFN-GPS-TOW ::=			ENUMERATED {
										ms1, ms2, ms3, ms5, ms10,
										ms20, ms50, ms100 }

ThresholdSFN-SFN-Change ::=			ENUMERATED {
										c0-25, c0-5, c1, c2, c3, c4, c5,
										c10, c20, c50, c100, c200, c500,
										c1000, c2000, c5000 }

ThresholdUsedFrequency ::=			INTEGER (-115..165)


-- Actual value = IE value * 20.
TimeInterval ::=					INTEGER (1..13)


TimeslotInfo ::=					SEQUENCE {
	timeslotNumber						TimeslotNumber,
	burstType							BurstType
}

TimeslotInfo-LCR-r4 ::=				SEQUENCE {
	timeslotNumber						TimeslotNumber-LCR-r4
}

TimeslotInfoList ::=				SEQUENCE (SIZE (1..maxTS)) OF
										TimeslotInfo

TimeslotInfoList-LCR-r4 ::=			SEQUENCE (SIZE (1..maxTS-LCR)) OF
										TimeslotInfo-LCR-r4

TimeslotInfoList-r4 ::=				CHOICE {
	tdd384								SEQUENCE (SIZE (1..maxTS)) OF
											TimeslotInfo,
	tdd128								SEQUENCE (SIZE (1..maxTS-LCR)) OF
											TimeslotInfo-LCR-r4
}

TimeslotISCP ::=					INTEGER (0..91)


-- The following list shall not include more than 6 elements in 1.28Mcps TDD mode.
TimeslotISCP-List ::=				SEQUENCE (SIZE (1..maxTS)) OF
										TimeslotISCP

TimeslotListWithISCP ::=			SEQUENCE (SIZE (1..maxTS)) OF
										TimeslotWithISCP

TimeslotWithISCP ::=				SEQUENCE {
```

```
    timeslot                            TimeslotNumber,
    timeslotISCP                        TimeslotISCP
}

TimeToTrigger ::=                   ENUMERATED {
                                        ttt0, ttt10, ttt20, ttt40, ttt60,
                                        ttt80, ttt100, ttt120, ttt160,
                                        ttt200, ttt240, tt320, ttt640,
                                        ttt1280, ttt2560, ttt5000 }

TrafficVolumeEventParam ::=         SEQUENCE {
    eventID                             TrafficVolumeEventType,
    reportingThreshold                  TrafficVolumeThreshold,
    timeToTrigger                       TimeToTrigger                       OPTIONAL,
    pendingTimeAfterTrigger             PendingTimeAfterTrigger             OPTIONAL,
    tx-InterruptionAfterTrigger         TX-InterruptionAfterTrigger         OPTIONAL
}

TrafficVolumeEventResults ::=       SEQUENCE {
    ul-transportChannelCausingEvent     UL-TrCH-Identity,
    trafficVolumeEventIdentity          TrafficVolumeEventType
}

TrafficVolumeEventType ::=          ENUMERATED {
                                        e4a,
                                        e4b }

TrafficVolumeMeasQuantity ::=       CHOICE {
    rlc-BufferPayload                   NULL,
    averageRLC-BufferPayload            TimeInterval,
    varianceOfRLC-BufferPayload         TimeInterval
}

TrafficVolumeMeasSysInfo ::=        SEQUENCE {
    trafficVolumeMeasurementID          MeasurementIdentity         DEFAULT 4,
    trafficVolumeMeasurementObjectList  TrafficVolumeMeasurementObjectList  OPTIONAL,
    trafficVolumeMeasQuantity           TrafficVolumeMeasQuantity           OPTIONAL,
    trafficVolumeReportingQuantity      TrafficVolumeReportingQuantity      OPTIONAL,
    dummy                               TrafficVolumeReportingCriteria      OPTIONAL,
    -- Above IE is not used in this version of protocol
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    measurementReportingMode            MeasurementReportingMode,
    reportCriteriaSysInf                TrafficVolumeReportCriteriaSysInfo

}

TrafficVolumeMeasuredResults ::=    SEQUENCE {
    rb-Identity                         RB-Identity,
    rlc-BuffersPayload                  RLC-BuffersPayload                  OPTIONAL,
    averageRLC-BufferPayload            AverageRLC-BufferPayload            OPTIONAL,
    varianceOfRLC-BufferPayload         VarianceOfRLC-BufferPayload         OPTIONAL
}

TrafficVolumeMeasuredResultsList ::= SEQUENCE (SIZE (1..maxRB)) OF
                                        TrafficVolumeMeasuredResults

TrafficVolumeMeasurement ::=        SEQUENCE {
    trafficVolumeMeasurementObjectList  TrafficVolumeMeasurementObjectList  OPTIONAL,
    trafficVolumeMeasQuantity           TrafficVolumeMeasQuantity           OPTIONAL,
    trafficVolumeReportingQuantity      TrafficVolumeReportingQuantity      OPTIONAL,
    measurementValidity                 MeasurementValidity                 OPTIONAL,
    reportCriteria                      TrafficVolumeReportCriteria
}

TrafficVolumeMeasurementObjectList ::= SEQUENCE (SIZE (1..maxTrCH)) OF
                                            UL-TrCH-Identity

TrafficVolumeReportCriteria ::=     CHOICE {
    trafficVolumeReportingCriteria      TrafficVolumeReportingCriteria,
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    noReporting                         NULL
}

TrafficVolumeReportCriteriaSysInfo ::=  CHOICE {
    trafficVolumeReportingCriteria      TrafficVolumeReportingCriteria,
    periodicalReportingCriteria         PeriodicalReportingCriteria
}
```

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

TrafficVolumeReportingQuantity ::= SEQUENCE {
    rlc-RB-BufferPayload                BOOLEAN,
    rlc-RB-BufferPayloadAverage         BOOLEAN,
    rlc-RB-BufferPayloadVariance        BOOLEAN
}

TrafficVolumeThreshold ::=          ENUMERATED {
                                        th8, th16, th32, th64, th128,
                                        th256, th512, th1024, th2k, th3k,
                                        th4k, th6k, th8k, th12k, th16k,
                                        th24k, th32k, th48k, th64k, th96k,
                                        th128k, th192k, th256k, th384k,
                                        th512k, th768k }

TransChCriteria ::=                 SEQUENCE {
    ul-transportChannelID               UL-TrCH-Identity                    OPTIONAL,
    eventSpecificParameters             SEQUENCE (SIZE (1..maxMeasParEvent)) OF
                                            TrafficVolumeEventParam         OPTIONAL
}

TransChCriteriaList ::=         SEQUENCE (SIZE (1..maxTrCH)) OF
                                        TransChCriteria

TransferMode ::=                    ENUMERATED {
                                        acknowledgedModeRLC,
                                        unacknowledgedModeRLC }

TransmittedPowerThreshold ::=       INTEGER (-50..33)

TriggeringCondition1 ::=            ENUMERATED {
                                        activeSetCellsOnly,
                                        monitoredSetCellsOnly,
                                        activeSetAndMonitoredSetCells }

TriggeringCondition2 ::=            ENUMERATED {
                                        activeSetCellsOnly,
                                        monitoredSetCellsOnly,
                                        activeSetAndMonitoredSetCells,
                                        detectedSetCellsOnly,
                                        detectedSetAndMonitoredSetCells }

TX-InterruptionAfterTrigger ::=     ENUMERATED {
                                        txiat0-25, txiat0-5, txiat1,
                                        txiat2, txiat4, txiat8, txiat16 }

UDRE ::=                            ENUMERATED {
                                        lessThan1,
                                        between1-and-4,
                                        between4-and-8,
                                        over8 }

UE-6AB-Event ::=                    SEQUENCE {
    timeToTrigger                       TimeToTrigger,
    transmittedPowerThreshold           TransmittedPowerThreshold
}

UE-6FG-Event ::=                    SEQUENCE {
    timeToTrigger                       TimeToTrigger,
-- in 1.28 Mcps TDD ue-RX-TX-TimeDifferenceThreshold corresponds to TADV Threshold
    ue-RX-TX-TimeDifferenceThreshold    UE-RX-TX-TimeDifferenceThreshold
}

UE-AutonomousUpdateMode ::=         CHOICE {
    on                                  NULL,
    onWithNoReporting                   NULL,
    off                                 RL-InformationLists
}

UE-InternalEventParam ::=           CHOICE {
    event6a                             UE-6AB-Event,
    event6b                             UE-6AB-Event,
    event6c                             TimeToTrigger,
    event6d                             TimeToTrigger,
```

```
    event6e                             TimeToTrigger,
    event6f                             UE-6FG-Event,
    event6g                             UE-6FG-Event
}

UE-InternalEventParamList ::=       SEQUENCE (SIZE (1..maxMeasEvent)) OF
                                        UE-InternalEventParam

UE-InternalEventResults ::=         CHOICE {
    event6a                             NULL,
    event6b                             NULL,
    event6c                             NULL,
    event6d                             NULL,
    event6e                             NULL,
    event6f                             PrimaryCPICH-Info,
    event6g                             PrimaryCPICH-Info
}

UE-InternalMeasQuantity ::=         SEQUENCE {
    measurementQuantity                 UE-MeasurementQuantity,
    filterCoefficient                   FilterCoefficient                   DEFAULT fc0
}

UE-InternalMeasuredResults ::=      SEQUENCE {
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ue-TransmittedPowerFDD              UE-TransmittedPower         OPTIONAL,
            ue-RX-TX-ReportEntryList            UE-RX-TX-ReportEntryList    OPTIONAL
        },
        tdd                                 SEQUENCE {
            ue-TransmittedPowerTDD-List         UE-TransmittedPowerTDD-List OPTIONAL,
            appliedTA                           UL-TimingAdvance            OPTIONAL
        }
    }
}

UE-InternalMeasuredResults-LCR-r4 ::=   SEQUENCE {
        ue-TransmittedPowerTDD-List         UE-TransmittedPowerTDD-List     OPTIONAL,
        t-ADVinfo                           T-ADVinfo                       OPTIONAL
}

UE-InternalMeasurement ::=          SEQUENCE {
    ue-InternalMeasQuantity             UE-InternalMeasQuantity             OPTIONAL,
    ue-InternalReportingQuantity        UE-InternalReportingQuantity        OPTIONAL,
    reportCriteria                      UE-InternalReportCriteria
}

UE-InternalMeasurement-r4 ::=       SEQUENCE {
    ue-InternalMeasQuantity             UE-InternalMeasQuantity             OPTIONAL,
    ue-InternalReportingQuantity        UE-InternalReportingQuantity-r4     OPTIONAL,
    reportCriteria                      UE-InternalReportCriteria
}

UE-InternalMeasurementSysInfo ::=   SEQUENCE {
    ue-InternalMeasurementID            MeasurementIdentity         DEFAULT 5,
    ue-InternalMeasQuantity             UE-InternalMeasQuantity
}

UE-InternalReportCriteria ::=       CHOICE {
    ue-InternalReportingCriteria        UE-InternalReportingCriteria,
    periodicalReportingCriteria         PeriodicalReportingCriteria,
    noReporting                         NULL
}

UE-InternalReportingCriteria ::=    SEQUENCE {
    ue-InternalEventParamList           UE-InternalEventParamList           OPTIONAL
}

UE-InternalReportingQuantity ::=    SEQUENCE {
    ue-TransmittedPower                 BOOLEAN,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ue-RX-TX-TimeDifference             BOOLEAN
        },
        tdd                                 SEQUENCE {
            appliedTA                           BOOLEAN
        }
    }
```

```
}

UE-InternalReportingQuantity-r4 ::= SEQUENCE {
    ue-TransmittedPower                 BOOLEAN,
    modeSpecificInfo                    CHOICE {
        fdd                                 SEQUENCE {
            ue-RX-TX-TimeDifference             BOOLEAN
        },
        tdd                                 SEQUENCE {
            tddOption                           CHOICE {
                tdd384                              SEQUENCE {
                    appliedTA                           BOOLEAN
                },
                tdd128                              SEQUENCE {
                    t-ADVinfo                           BOOLEAN
                }
            }
        }
    }
}

-- TABULAR: For 3.84 Mcps TDD only the first two values are used.
-- for 1.28 Mcps TDD ue-RX-TX-TimeDifference corresponds to T_ADV in the tabular
UE-MeasurementQuantity ::=          ENUMERATED {
                                        ue-TransmittedPower,
                                        utra-Carrier-RSSI,
                                        ue-RX-TX-TimeDifference }

UE-RX-TX-ReportEntry ::=            SEQUENCE {
    primaryCPICH-Info                   PrimaryCPICH-Info,
    ue-RX-TX-TimeDifferenceType1        UE-RX-TX-TimeDifferenceType1
}

UE-RX-TX-ReportEntryList ::=        SEQUENCE (SIZE (1..maxRL)) OF
                                        UE-RX-TX-ReportEntry

UE-RX-TX-TimeDifferenceType1 ::=            INTEGER (768..1280)

-- Actual value = IE value * 0.0625 + 768
UE-RX-TX-TimeDifferenceType2 ::=    INTEGER (0..8191)

UE-RX-TX-TimeDifferenceType2Info ::=    SEQUENCE {
    ue-RX-TX-TimeDifferenceType2            UE-RX-TX-TimeDifferenceType2,
    neighbourQuality                        NeighbourQuality
}

--in 1.28 Mcps TDD actual value for T_ADV Threshold = (UE-RX-TX-TimeDifferenceThreshold - 768) * 0.125
UE-RX-TX-TimeDifferenceThreshold ::= INTEGER (768..1280)

UE-TransmittedPower ::=             INTEGER (0..104)

UE-TransmittedPowerTDD-List ::=     SEQUENCE (SIZE (1..maxTS)) OF
                                        UE-TransmittedPower

UL-TrCH-Identity ::=                    CHOICE{
    dch                                 TransportChannelIdentity,
    -- Default transport channel in the UL is either RACH or CPCH, but not both.
    rachorcpch                          NULL,
    usch                                TransportChannelIdentity
}

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,
    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-ReferenceCellInfo
    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)
    },
    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-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,  utran-GPSReferenceTime              UTRAN-
GPSReferenceTime                OPTIONAL,
    sfn-tow-Uncertainty                SFN-TOW-Uncertainty                 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-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-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-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-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-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 {},
        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-r4 ::= SEQUENCE (SIZE (1..maxCellMeas)) OF
                                                UE-Positioning-OTDOA-NeighbourCellInfo-r4

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 {},
        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 {
    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
                }
            }
        }
    },
    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,
    dummy1                              UE-Positioning-ResponseTime,
-- This IE is not used in this version of the specification and should be ignored.
-- IE “dummy1” should be removed in later versions of the message including this IE
    accuracy                            UE-Positioning-Accuracy             OPTIONAL,
    gps-TimingOfCellWanted              BOOLEAN,
    dummy2                              BOOLEAN,
-- This IE is not used in this version of the specification and should be ignored.
-- IE “dummy2” 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
```

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}

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 {
    utran-GPSTimingOfCell           INTEGER(0..2322431999999),
    modeSpecificInfo                CHOICE {
        fdd                             SEQUENCE {
            referenceIdentity               PrimaryCPICH-Info
        },
        tdd                             SEQUENCE {
            referenceIdentity               CellParametersID
        }
    }               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)
--
-- ***************************************************

BCC ::=                             INTEGER (0..7)

BCCH-ModificationInfo ::=           SEQUENCE {
    mib-ValueTag                        MIB-ValueTag,
    bcch-ModificationTime               BCCH-ModificationTime               OPTIONAL
}

-- Actual value = IE value * 8
BCCH-ModificationTime ::=           INTEGER (0..511)

BSIC ::=                            SEQUENCE {
    ncc                                 NCC,
    bcc                                 BCC
}

CBS-DRX-Level1Information ::=       SEQUENCE {
    ctch-AllocationPeriod               INTEGER (1..256),
    cbs-FrameOffset                     INTEGER (0..255)
}

CDMA2000-Message ::=                SEQUENCE {
    msg-Type                            BIT STRING (SIZE (8)),
    payload                             BIT STRING (SIZE (1..512))
```

```
}

CDMA2000-MessageList ::=                SEQUENCE (SIZE (1..maxInterSysMessages)) OF
                                            CDMA2000-Message

CDMA2000-UMTS-Frequency-List    ::=     SEQUENCE (SIZE (1..maxNumCDMA2000Freqs)) OF
                                            FrequencyInfoCDMA2000

CellValueTag ::=                        INTEGER (1..4)

--Actual value = 2^(IE value)
ExpirationTimeFactor            ::=     INTEGER (1..8)

FDD-UMTS-Frequency-List         ::=     SEQUENCE (SIZE (1..maxNumFDDFreqs)) OF
                                            FrequencyInfoFDD

FrequencyInfoCDMA2000           ::=     SEQUENCE {
                                            band-Class      BIT STRING (SIZE (5)),
                                            cdma-Freq       BIT STRING (SIZE(11))
}

GSM-BA-Range                    ::=     SEQUENCE {
                                            gsmLowRangeUARFCN       UARFCN,
                                            gsmUpRangeUARFCN        UARFCN
}

GSM-BA-Range-List               ::=     SEQUENCE (SIZE (1..maxNumGSMFreqRanges)) OF
                                            GSM-BA-Range

GSM-Classmark2::=                   OCTET STRING (SIZE (5))

GSM-Classmark3::=                   OCTET STRING (SIZE (1..32))

GSM-MessageList ::=                 SEQUENCE (SIZE (1..maxInterSysMessages)) OF
                                        BIT STRING (SIZE (1..512))

GsmSecurityCapability ::=           BIT STRING {
                                        a5-7(0),
                                        a5-6(1),
                                        a5-5(2),
                                        a5-4(3),
                                        a5-3(4),
                                        a5-2(5),
                                        a5-1(6)
                                        }   (SIZE (7))

IdentificationOfReceivedMessage::=  SEQUENCE {
        rrc-TransactionIdentifier       RRC-TransactionIdentifier,
        receivedMessageType             ReceivedMessageType
}

InterRAT-ChangeFailureCause ::=     CHOICE {
    configurationUnacceptable           NULL,
    physicalChannelFailure              NULL,
    protocolError                       ProtocolErrorInformation,
    unspecified                         NULL,
    spare1                              NULL,
    spare2                              NULL,
    spare3                              NULL
}

InterRAT-UE-RadioAccessCapability ::= CHOICE {
    gsm                                 SEQUENCE {
        gsm-Classmark2                      GSM-Classmark2,
        gsm-Classmark3                      GSM-Classmark3
    },
    cdma2000                            SEQUENCE {
        cdma2000-MessageList                CDMA2000-MessageList
    }
}

InterRAT-UE-RadioAccessCapabilityList ::=   SEQUENCE (SIZE(1..maxInterSysMessages)) OF
                                            InterRAT-UE-RadioAccessCapability

InterRAT-UE-SecurityCapability ::= CHOICE {
    gsm                                 SEQUENCE {
        gsmSecurityCapability           GsmSecurityCapability
    }
```

```
}

InterRAT-UE-SecurityCapList ::=     SEQUENCE (SIZE(1..maxInterSysMessages)) OF
                                        InterRAT-UE-SecurityCapability

InterRAT-HO-FailureCause ::=        CHOICE {
    configurationUnacceptable           NULL,
    physicalChannelFailure              NULL,
    protocolError                       ProtocolErrorInformation,
    interRAT-ProtocolError              NULL,
    unspecified                         NULL,
    spare1                              NULL,
    spare2                              NULL,
    spare3                              NULL,
    spare4                              NULL
}

MasterInformationBlock ::=          SEQUENCE {
        mib-ValueTag                    MIB-ValueTag,
        plmn-Type                       PLMN-Type,
        -- TABULAR: The PLMN identity and ANSI-41 core network information
        -- are included in PLMN-Type.
        sibSb-ReferenceList             SIBSb-ReferenceList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

MIB-ValueTag ::=                    INTEGER (1..8)

NCC ::=                             INTEGER (0..7)

PLMN-ValueTag ::=                   INTEGER (1..256)


PredefinedConfigIdentityAndValueTag ::= SEQUENCE {
    predefinedConfigIdentity                PredefinedConfigIdentity,
    predefinedConfigValueTag                PredefinedConfigValueTag
}

ProtocolErrorInformation ::=        SEQUENCE {
    diagnosticsType                     CHOICE {
        type1                               SEQUENCE {
            protocolErrorCause                  ProtocolErrorCause
        },
        spare                               NULL
    }
}

ReceivedMessageType ::=             ENUMERATED {
                                        activeSetUpdate,
                                        cellChangeOrderFromUTRAN,
                                        cellUpdateConfirm,
                                        counterCheck,
                                        downlinkDirectTransfer,
                                        interRATHandoverCommand,
                                        measurementControl,
                                        pagingType2,
                                        physicalChannelReconfiguration,
                                        physicalSharedChannelAllocation,
                                        radioBearerReconfiguration,
                                        radioBearerRelease,
                                        radioBearerSetup,
                                        rrcConnectionRelease,
                                        rrcConnectionReject,
                                        rrcConnectionSetup,
                                        securityModeCommand,
                                        signallingConnectionRelease,
                                        transportChannelReconfiguration,
                                        transportFormatCombinationControl,
                                        ueCapabilityEnquiry,
                                        ueCapabilityInformationConfirm,
                                        uplinkPhysicalChannelControl,
                                        uraUpdateConfirm,
                                        utranMobilityInformation,
                                        assistanceDataDelivery,
                                        spare1, spare2, spare3, spare4,
                                        spare5
}
```

```
Rplmn-Information               ::=     SEQUENCE {
                                            gsm-BA-Range-List       GSM-BA-Range-List   OPTIONAL,
                                            fdd-UMTS-Frequency-List FDD-UMTS-Frequency-List
    OPTIONAL,
                                            tdd-UMTS-Frequency-List TDD-UMTS-Frequency-List
    OPTIONAL,
                                            cdma2000-UMTS-Frequency-List    CDMA2000-UMTS-Frequency-
List    OPTIONAL
}

Rplmn-Information-r4 ::=        SEQUENCE {
    gsm-BA-Range-List               GSM-BA-Range-List                       OPTIONAL,
    fdd-UMTS-Frequency-List         FDD-UMTS-Frequency-List                 OPTIONAL,
    tdd384-UMTS-Frequency-List      TDD-UMTS-Frequency-List                 OPTIONAL,
    tdd128-UMTS-Frequency-List      TDD-UMTS-Frequency-List                 OPTIONAL,
    cdma2000-UMTS-Frequency-List    CDMA2000-UMTS-Frequency-List            OPTIONAL
}

SchedulingInformation ::=           SEQUENCE {
    scheduling                          SEQUENCE {
        segCount                            SegCount                            DEFAULT 1,
        sib-Pos                             CHOICE {
            -- The element name indicates the repetition period and the value
            -- (multiplied by two) indicates the position of the first segment.
            rep4                                INTEGER (0..1),
            rep8                                INTEGER (0..3),
            rep16                               INTEGER (0..7),
            rep32                               INTEGER (0..15),
            rep64                               INTEGER (0..31),
            rep128                              INTEGER (0..63),
            rep256                              INTEGER (0..127),
            rep512                              INTEGER (0..255),
            rep1024                             INTEGER (0..511),
            rep2048                             INTEGER (0..1023),
            rep4096                             INTEGER (0..2047)
        },
        sib-PosOffsetInfo                   SibOFF-List                         OPTIONAL
    }
}

SchedulingInformationSIB ::=            SEQUENCE {
    sib-Type                            SIB-TypeAndTag,
    scheduling                          SchedulingInformation
}

SchedulingInformationSIBSb ::=          SEQUENCE {
    sibSb-Type                          SIBSb-TypeAndTag,
    scheduling                          SchedulingInformation
}

SegCount ::=                        INTEGER (1..16)

SegmentIndex ::=                    INTEGER (1..15)

-- Actual value = 2 * IE value
SFN-Prime ::=                       INTEGER (0..2047)


SIB-Data-fixed ::=                  BIT STRING (SIZE (222))


SIB-Data-variable ::=               BIT STRING (SIZE (1..214))

SIBOccurIdentity ::=            INTEGER (0..15)

SIBOccurrenceIdentityAndValueTag ::=    SEQUENCE {
    sibOccurIdentity                SIBOccurIdentity,
    sibOccurValueTag                SIBOccurValueTag
}

SIBOccurValueTag ::=            INTEGER (0..15)

SIB-ReferenceList ::=               SEQUENCE (SIZE (1..maxSIB)) OF
                                        SchedulingInformationSIB

SIBSb-ReferenceList ::=             SEQUENCE (SIZE (1..maxSIB)) OF
                                        SchedulingInformationSIBSb
```

```
SIB-ReferenceListFACH ::=           SEQUENCE (SIZE (1..maxSIB-FACH)) OF
                                        SchedulingInformationSIB

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 }

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

}

SibOFF ::=                          ENUMERATED {
                                        so2, so4, so6, so8, so10,
                                        so12, so14, so16, so18,
                                        so20, so22, so24, so26,
                                        so28, so30, so32 }

SibOFF-List ::=                     SEQUENCE (SIZE (1..15)) OF
                                        SibOFF

SysInfoType1 ::=                    SEQUENCE {
    -- Core network IEs
        cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
        cn-DomainSysInfoList            CN-DomainSysInfoList,
    -- User equipment IEs
        ue-ConnTimersAndConstants       UE-ConnTimersAndConstants           OPTIONAL,
        ue-IdleTimersAndConstants       UE-IdleTimersAndConstants           OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType2 ::=                    SEQUENCE {
    -- UTRAN mobility IEs
        ura-IdentityList                URA-IdentityList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType3 ::=                    SEQUENCE {
        sib4indicator                   BOOLEAN,
    -- UTRAN mobility IEs
        cellIdentity                    CellIdentity,
        cellSelectReselectInfo          CellSelectReselectInfoSIB-3-4,
        cellAccessRestriction           CellAccessRestriction,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType3-r3-r4-ext          SysInfoType3-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType3-r3-r4-ext-IEs ::= SEQUENCE {
    mapping-LCR                     Mapping-LCR-r4                          OPTIONAL
}

SysInfoType4 ::=                    SEQUENCE {
    -- UTRAN mobility IEs
        cellIdentity                    CellIdentity,
        cellSelectReselectInfo          CellSelectReselectInfoSIB-3-4,
        cellAccessRestriction           CellAccessRestriction,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType4-r3-r4-ext          SysInfoType4-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}
```

```
SysInfoType4-r3-r4-ext-IEs ::= SEQUENCE {
    mapping-LCR                     Mapping-LCR-r4                          OPTIONAL
}

SysInfoType5 ::=                    SEQUENCE {
        sib6indicator                   BOOLEAN,
    -- Physical channel IEs
        pich-PowerOffset                PICH-PowerOffset,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                aich-PowerOffset                AICH-PowerOffset
            },
            tdd                             SEQUENCE {
    -- If PDSCH/PUSCH is configured for 1.28Mcps TDD, the following IEs should be absent
    --   and the info included in the tdd128SpecificInfo instead.
                pusch-SysInfoList-SFN           PUSCH-SysInfoList-SFN       OPTIONAL,
                pdsch-SysInfoList-SFN           PDSCH-SysInfoList-SFN       OPTIONAL,
                openLoopPowerControl-TDD        OpenLoopPowerControl-TDD
            }
        },
        primaryCCPCH-Info               PrimaryCCPCH-Info                   OPTIONAL,
        prach-SystemInformationList     PRACH-SystemInformationList,
        sCCPCH-SystemInformationList    SCCPCH-SystemInformationList,
        cbs-DRX-Level1Information       CBS-DRX-Level1Information           OPTIONAL,
        -- Conditional on any of the CTCH indicator IEs in
        -- sCCPCH-SystemInformationList
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType5-r3-r4-ext          SysInfoType5-r3-r4-ext-IEs,
        -- Extension mechanism for non- rel-4 information
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType5-r3-r4-ext-IEs ::= SEQUENCE {
    pNBSCH-Allocation-r4            PNBSCH-Allocation-r4            OPTIONAL,
    -- In case of TDD, the following IE is included instead of the
    -- IE up-IPDL-Parameter in up-OTDOA-AssistanceData.
    openLoopPowerControl-IPDL-TDD   OpenLoopPowerControl-IPDL-TDD-r4    OPTIONAL,
-- If SysInfoType5 is sent to describe a 1.28Mcps TDD cell, the IE PRACH-RACH-Info included in
-- PRACH-SystemInformationList shall be ignored, the IE PRACH-Partitioning and the
-- IE rach-TransportFormatSet shall be absent and the corresponding IE in the following
-- PRACH-SystemInformationList-LCR-r4 shall be used
    prach-SystemInformationList-LCR-r4  PRACH-SystemInformationList-LCR-r4  OPTIONAL,
    tdd128SpecificInfo              SEQUENCE {
        pusch-SysInfoList-SFN           PUSCH-SysInfoList-SFN-LCR-r4    OPTIONAL,
        pdsch-SysInfoList-SFN           PDSCH-SysInfoList-SFN-LCR-r4    OPTIONAL,
        pCCPCH-LCR-Extensions           PrimaryCCPCH-Info-LCR-r4-ext    OPTIONAL,
        sCCPCH-LCR-ExtensionsList       SCCPCH-SystemInformationList-LCR-r4-ext
    }                                                               OPTIONAL
}

SysInfoType6 ::=                    SEQUENCE {
    -- Physical channel IEs
        pich-PowerOffset                PICH-PowerOffset,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                aich-PowerOffset                AICH-PowerOffset,
                dummy                           CSICH-PowerOffset           OPTIONAL
            -- This parameter dummy is not to be sent in the current version of the specification.
            },
            tdd                             SEQUENCE {
    -- If PDSCH/PUSCH is configured for 1.28Mcps TDD, the following IEs should be absent
    --   and the info included in the tdd128SpecificInfo instead.
                pusch-SysInfoList-SFN           PUSCH-SysInfoList-SFN       OPTIONAL,
                pdsch-SysInfoList-SFN           PDSCH-SysInfoList-SFN       OPTIONAL,
                openLoopPowerControl-TDD        OpenLoopPowerControl-TDD
            }
        },
        primaryCCPCH-Info               PrimaryCCPCH-Info                   OPTIONAL,
        prach-SystemInformationList     PRACH-SystemInformationList         OPTIONAL,
        sCCPCH-SystemInformationList    SCCPCH-SystemInformationList        OPTIONAL,
        cbs-DRX-Level1Information       CBS-DRX-Level1Information           OPTIONAL,
        -- Conditional on any of the CTCH indicator IEs in
        -- sCCPCH-SystemInformationList
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
```

```
            sysInfoType6-r3-r4-ext          SysInfoType6-r3-r4-ext-IEs,
        -- Extension mechanism for non- rel-4 information
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType6-r3-r4-ext-IEs ::= SEQUENCE {
    -- This IE is present only if IPDLs are applied for TDD
    openLoopPowerControl-IPDL-TDD   OpenLoopPowerControl-IPDL-TDD-r4    OPTIONAL,
-- If SysInfoType6 is sent to describe a 1.28Mcps TDD cell, the IE PRACH-RACH-Info included in
-- PRACH-SystemInformationList shall be ignored, the IE PRACH-Partitioning and the
-- IE rach-TransportFormatSet shall be absent and the corresponding IEs in the following
-- PRACH-SystemInformationList-LCR-r4 shall be used
    prach-SystemInformationList-LCR-r4  PRACH-SystemInformationList-LCR-r4  OPTIONAL,
    tdd128SpecificInfo              SEQUENCE {
        pusch-SysInfoList-SFN           PUSCH-SysInfoList-SFN-LCR-r4    OPTIONAL,
        pdsch-SysInfoList-SFN           PDSCH-SysInfoList-SFN-LCR-r4    OPTIONAL,
        pCCPCH-LCR-Extensions           PrimaryCCPCH-Info-LCR-r4-ext    OPTIONAL,
        sCCPCH-LCR-ExtensionsList       SCCPCH-SystemInformationList-LCR-r4-ext OPTIONAL
    }                                                               OPTIONAL
}

SysInfoType7 ::=                    SEQUENCE {
    -- Physical channel IEs
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                ul-Interference                 UL-Interference
            },
            tdd                             NULL
        },
        prach-Information-SIB5-List     DynamicPersistenceLevelList,
        prach-Information-SIB6-List     DynamicPersistenceLevelList         OPTIONAL,
        expirationTimeFactor            ExpirationTimeFactor                OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType8 ::=                    SEQUENCE {
    -- User equipment IEs
        cpch-Parameters                 CPCH-Parameters,
    -- Physical channel IEs
        cpch-SetInfoList                CPCH-SetInfoList,
        csich-PowerOffset               CSICH-PowerOffset,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType9 ::=                    SEQUENCE {
    -- Physical channel IEs
        cpch-PersistenceLevelsList      CPCH-PersistenceLevelsList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType10 ::=                   SEQUENCE {
    -- User equipment IEs
        drac-SysInfoList                DRAC-SysInfoList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType11 ::=                   SEQUENCE {
        sib12indicator                  BOOLEAN,
    -- Measurement IEs
        fach-MeasurementOccasionInfo    FACH-MeasurementOccasionInfo        OPTIONAL,
        measurementControlSysInfo       MeasurementControlSysInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType11-r3-r4-ext         SysInfoType11-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType11-r3-r4-ext-IEs ::= SEQUENCE {
    fach-MeasurementOccasionInfo-LCR-Ext    FACH-MeasurementOccasionInfo-LCR-r4-ext OPTIONAL,
    measurementControlSysInfo-LCR           MeasurementControlSysInfo-LCR-r4-ext
}
```

```
SysInfoType12 ::=                   SEQUENCE {
    -- Measurement IEs
        fach-MeasurementOccasionInfo    FACH-MeasurementOccasionInfo        OPTIONAL,
        measurementControlSysInfo       MeasurementControlSysInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType12-r3-r4-ext         SysInfoType12-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType12-r3-r4-ext-IEs ::= SEQUENCE {
    fach-MeasurementOccasionInfo-LCR-Ext    FACH-MeasurementOccasionInfo-LCR-r4-ext OPTIONAL,
    measurementControlSysInfo-LCR           MeasurementControlSysInfo-LCR-r4-ext
}

SysInfoType13 ::=                   SEQUENCE {
    -- Core network IEs
        cn-DomainSysInfoList            CN-DomainSysInfoList,
    -- User equipment IEs
        ue-IdleTimersAndConstants       UE-IdleTimersAndConstants           OPTIONAL,
        capabilityUpdateRequirement     CapabilityUpdateRequirement         OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType13-r3-r4-ext         SysInfoType13-r3-r4-ext-IEs,
        -- Extension mechanism for non- release99 information
            nonCriticalExtensions           SEQUENCE {}                     OPTIONAL
        }                           OPTIONAL
}

SysInfoType13-r3-r4-ext-IEs ::= SEQUENCE {
    capabilityUpdateRequirement-r4Ext   CapabilityUpdateRequirement-r4-ext  OPTIONAL
}

SysInfoType13-1 ::=                 SEQUENCE {
    -- ANSI-41 IEs
        ansi-41-RAND-Information        ANSI-41-RAND-Information,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType13-2 ::=                 SEQUENCE {
    -- ANSI-41 IEs
        ansi-41-UserZoneID-Information  ANSI-41-UserZoneID-Information,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType13-3 ::=                 SEQUENCE {
    -- ANSI-41 IEs
        ansi-41-PrivateNeighbourListInfo ANSI-41-PrivateNeighbourListInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType13-4 ::=                 SEQUENCE {
    -- ANSI-41 IEs
        ansi-41-GlobalServiceRedirectInfo
                                        ANSI-41-GlobalServiceRedirectInfo,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoType14 ::=                   SEQUENCE {
    -- Physical channel IEs
        individualTS-InterferenceList   IndividualTS-InterferenceList,
        expirationTimeFactor            ExpirationTimeFactor                OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

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 {}						OPTIONAL
}

SysInfoType16 ::=					SEQUENCE {
	-- Radio bearer IEs
		preDefinedRadioConfiguration		PreDefRadioConfiguration,
	-- Extension mechanism for non- release99 information
		nonCriticalExtensions			SEQUENCE {}							OPTIONAL
}

SysInfoType17 ::=					SEQUENCE {
	-- Physical channel IEs
	-- If PDSCH/PUSCH is configured for 1.28Mcps TDD, the following IEs should be absent
```

```
    --   and the info included in the tdd128SpecificInfo instead.
        pusch-SysInfoList               PUSCH-SysInfoList               OPTIONAL,
        pdsch-SysInfoList               PDSCH-SysInfoList               OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {
            sysInfoType17-r3-r4-ext         SysInfoType17-r3-r4-ext-IEs,
            nonCriticalExtensions           SEQUENCE {}             OPTIONAL
        }                           OPTIONAL
}

SysInfoType17-r3-r4-ext-IEs ::= SEQUENCE {
    tdd128SpecificInfo          SEQUENCE {
        pusch-SysInfoList               PUSCH-SysInfoList-LCR-r4        OPTIONAL,
        pdsch-SysInfoList               PDSCH-SysInfoList-LCR-r4        OPTIONAL
    }                                                               OPTIONAL
}

SysInfoType18 ::=                       SEQUENCE {
        idleModePLMNIdentities          PLMNIdentitiesOfNeighbourCells      OPTIONAL,
        connectedModePLMNIdentities PLMNIdentitiesOfNeighbourCells      OPTIONAL,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}     OPTIONAL
}

SysInfoTypeSB1 ::=                  SEQUENCE {
    -- Other IEs
        sib-ReferenceList               SIB-ReferenceList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}

SysInfoTypeSB2 ::=                  SEQUENCE {
    -- Other IEs
        sib-ReferenceList               SIB-ReferenceList,
    -- Extension mechanism for non- release99 information
        nonCriticalExtensions           SEQUENCE {}                         OPTIONAL
}
TDD-UMTS-Frequency-List ::=             SEQUENCE (SIZE (1..maxNumTDDFreqs)) OF
                                            FrequencyInfoTDD

-- ***************************************************
--
--     ANSI-41 INFORMATION ELEMENTS (10.3.9)
--
-- ***************************************************

ANSI-41-GlobalServiceRedirectInfo ::=   ANSI-41-NAS-Parameter
ANSI-41-PrivateNeighbourListInfo ::=    ANSI-41-NAS-Parameter
ANSI-41-RAND-Information ::=            ANSI-41-NAS-Parameter
ANSI-41-UserZoneID-Information ::=      ANSI-41-NAS-Parameter
ANSI-41-NAS-Parameter ::=               BIT STRING (SIZE (1..2048))

Min-P-REV ::=                           BIT STRING (SIZE (8))

NAS-SystemInformationANSI-41 ::=        ANSI-41-NAS-Parameter
NID ::=                                 BIT STRING (SIZE (16))

P-REV ::=                               BIT STRING (SIZE (8))

SID ::=                                 BIT STRING (SIZE (15))

END
```

11.4 Constant definitions

```
Constant-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

hiPDSCHidentities           INTEGER ::= 64
hiPUSCHidentities           INTEGER ::= 64
hiRM                        INTEGER ::= 256
maxAC                       INTEGER ::= 16
maxAdditionalMeas           INTEGER ::= 4
maxASC                      INTEGER ::= 8
maxASCmap                   INTEGER ::= 7
maxASCpersist               INTEGER ::= 6
```

```
maxCCTrCH                    INTEGER ::= 8
maxCellMeas                  INTEGER ::= 32
maxCellMeas-1                INTEGER ::= 31
maxCNdomains                 INTEGER ::= 4
maxCPCHsets                  INTEGER ::= 16
maxDPCH-DLchan               INTEGER ::= 8
maxDPDCH-UL                  INTEGER ::= 6
maxDRACclasses               INTEGER ::= 8
maxFACHPCH                   INTEGER ::= 8
maxFreq                      INTEGER ::= 8
maxFreqBandsFDD              INTEGER ::= 8
maxFreqBandsTDD              INTEGER ::= 4
maxFreqBandsGSM              INTEGER ::= 16
maxInterSysMessages          INTEGER ::= 4
maxLoCHperRLC                INTEGER ::= 2
maxMeasEvent                 INTEGER ::= 8
maxMeasIntervals             INTEGER ::= 3
maxMeasParEvent              INTEGER ::= 2
maxNumCDMA2000Freqs          INTEGER ::=  8
maxNumGSMFreqRanges          INTEGER ::= 32
maxNumFDDFreqs               INTEGER ::=  8
maxNumTDDFreqs               INTEGER ::=  8
maxNoOfMeas                  INTEGER ::= 16
maxOtherRAT                  INTEGER ::= 15
maxPage1                     INTEGER ::= 8
maxPCPCH-APsig               INTEGER ::= 16
maxPCPCH-APsubCh             INTEGER ::= 12
maxPCPCH-CDsig               INTEGER ::= 16
maxPCPCH-CDsubCh             INTEGER ::= 12
maxPCPCH-SF                  INTEGER ::= 7
maxPCPCHs                    INTEGER ::= 64
maxPDCPAlgoType              INTEGER ::= 8
maxPDSCH                     INTEGER ::= 8
maxPDSCH-TFCIgroups          INTEGER ::= 256
maxPRACH                     INTEGER ::= 16
maxPRACH-FPACH               INTEGER ::= 8
maxPredefConfig              INTEGER ::= 16
maxPUSCH                     INTEGER ::= 8
maxRABsetup                  INTEGER ::= 16
maxRAT                       INTEGER ::= 16
maxRB                        INTEGER ::= 32
maxRBallRABs                 INTEGER ::= 27
maxRBMuxOptions              INTEGER ::= 8
maxRBperRAB                  INTEGER ::= 8
maxReportedGSMCells          INTEGER ::= 6
maxRL                        INTEGER ::= 8
maxRL-1                      INTEGER ::= 7
maxROHC-PacketSizes-r4       INTEGER ::= 16
maxROHC-Profile-r4           INTEGER ::= 8
maxSat                       INTEGER ::= 16
maxSCCPCH                    INTEGER ::= 16
maxSIB                       INTEGER ::= 32
maxSIB-FACH                  INTEGER ::= 8
maxSIBperMsg                 INTEGER ::= 16
maxSRBsetup                  INTEGER ::= 8
maxSystemCapability          INTEGER ::= 16
maxTF                        INTEGER ::= 32
maxTF-CPCH                   INTEGER ::= 16
maxTFC                       INTEGER ::= 1024
maxTFCI-2-Combs              INTEGER ::= 512
maxTGPS                      INTEGER ::= 6
maxTrCH                      INTEGER ::= 32
-- maxTrCHpreconf should be 16 but has been set to 32 for compatibility
maxTrCHpreconf               INTEGER ::= 32
maxTS                        INTEGER ::= 14
maxTS-1                      INTEGER ::= 13
maxTS-LCR                    INTEGER ::= 6
maxTS-LCR-1                  INTEGER ::= 5
maxURA                       INTEGER ::= 8

END
```

11.5 RRC information between network nodes

```
Internode-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN
```

```
IMPORTS

    HandoverToUTRANCommand,
    MeasurementReport,
    PhysicalChannelReconfiguration,
    RadioBearerReconfiguration,
    RadioBearerRelease,
    RadioBearerSetup,
    RRC-FailureInfo-r3-IEs,
    TransportChannelReconfiguration
FROM PDU-definitions

-- Core Network IEs :
    CN-DomainIdentity,
    CN-DomainInformationList,
    CN-DRX-CycleLengthCoefficient,
    NAS-SystemInformationGSM-MAP,
-- UTRAN Mobility IEs :
    CellIdentity,
    URA-Identity,
-- User Equipment IEs :
    C-RNTI,
    DL-PhysChCapabilityFDD-v380ext,
    FailureCauseWithProtErr,
    RRC-MessageSequenceNumber,
    STARTList,
    U-RNTI,
    UE-RadioAccessCapability,
    UE-RadioAccessCapability-v370ext,
    UE-RadioAccessCapability-v380ext,
-- Radio Bearer IEs :
    PredefinedConfigStatusList,
    PredefinedConfigValueTag,
    RAB-InformationSetupList,
    SRB-InformationSetupList,
-- Transport Channel IEs :
    CPCH-SetID,
    DL-CommonTransChInfo,
    DL-AddReconfTransChInfoList,
    DRAC-StaticInformationList,
    UL-CommonTransChInfo,
    UL-AddReconfTransChInfoList,
-- Measurement IEs :
    MeasurementIdentity,
    MeasurementReportingMode,
    MeasurementType,
    MeasurementType-r4,
    AdditionalMeasurementID-List,
    PositionEstimate,
    UE-Positioning-IPDL-Parameters-TDD-r4-ext,
-- Other IEs :
InterRAT-UE-RadioAccessCapabilityList
FROM InformationElements

    maxCNdomains,
    maxNoOfMeas,

    maxRB,
    maxSRBsetup
FROM Constant-definitions
;

-- Part 1: Class definitions similar to what has been defined in 11.1 for RRC messages
-- Information that is tranferred in the same direction and across the same path is grouped

-- ***************************************************
--
-- RRC information, to target RNC
--
-- ***************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT

ToTargetRNC-Container ::= CHOICE {
    interRATHandoverInfo                InterRATHandoverInfoWithInterRATCapabilities-r3,
    srncRelocation                      SRNC-RelocationInfo-r3,
    extension                           NULL
}
```

```
-- ***************************************************
--
-- RRC information, target RNC to source RNC
--
-- ***************************************************


Target-RNC-ToSourceRNC-Container ::= CHOICE {
    radioBearerSetup                    RadioBearerSetup,
    radioBearerReconfiguration          RadioBearerReconfiguration,
    radioBearerRelease                  RadioBearerRelease,
    transportChannelReconfiguration     TransportChannelReconfiguration,
    physicalChannelReconfiguration      PhysicalChannelReconfiguration,
    rrc-FailureInfo                     RRC-FailureInfo-r3-IEs,
    extension                           NULL
}

-- Part 2: Container definitions, similar to the PDU definitions in 11.2 for RRC messages
-- In alphabetical order


-- ***************************************************
--
-- Handover to UTRAN information
--
-- ***************************************************

InterRATHandoverInfoWithInterRATCapabilities-r3 ::= CHOICE {
    r3                              SEQUENCE {
        interRATHandoverInfo-r3         InterRATHandoverInfoWithInterRATCapabilities-r3-IEs,
    -- IE InterRATHandoverInfoWithInterRATCapabilities-r3-IEs also
    -- includes non critical extensions
        v390NonCriticalExtensions           SEQUENCE {
            interRATHandoverInfoWithInterRATCapabilities-v390ext
    InterRATHandoverInfoWithInterRATCapabilities-v390ext-IEs,
            -- Reserved for future non critical extension
            nonCriticalExtensions           SEQUENCE {} OPTIONAL
        }       OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

InterRATHandoverInfoWithInterRATCapabilities-r3-IEs::=      SEQUENCE {
        -- The order of the IEs may not reflect the tabular format
        --  but has been chosen to simplify the handling of the information in the BSC
    --  Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
        interRATHandoverInfo            OCTET STRING (SIZE (0..255))
        -- Octet string is used to obtain 8 bit length field prior to actual information
        -- This makes it possible for BSS to transparently handle information received via
        -- GSM air interface even when it includes non critical extensions
        -- The octet string shall include the InterRATHandoverInfo information
        -- The BSS can re-use the 04.18 length field received from the MS
}

InterRATHandoverInfoWithInterRATCapabilities-v390ext-IEs ::= SEQUENCE {
    -- User equipment IEs
        failureCauseWithProtErr             FailureCauseWithProtErr                 OPTIONAL
}

-- ***************************************************
--
-- SRNC Relocation information
--
-- ***************************************************

SRNC-RelocationInfo-r3 ::= CHOICE {
    r3                              SEQUENCE {
        sRNC-RelocationInfo-r3          SRNC-RelocationInfo-r3-IEs,
            v380NonCriticalExtensions           SEQUENCE {
                sRNC-RelocationInfo-v380ext SRNC-RelocationInfo-v380ext-IEs,
                -- Reserved for future non critical extension
                v390NonCriticalExtensions           SEQUENCE {
                    sRNC-RelocationInfo-v390ext         SRNC-RelocationInfo-v390ext-IEs,
                    -- Reserved for future non critical extension
                    nonCriticalExtensions           SEQUENCE {} OPTIONAL
                }       OPTIONAL
```

```
            }       OPTIONAL
    },
    criticalExtensions              SEQUENCE {}
}

SRNC-RelocationInfo-r3-IEs ::=      SEQUENCE {
    -- Non-RRC IEs
        stateOfRRC                      StateOfRRC,
        stateOfRRC-Procedure            StateOfRRC-Procedure,
    -- Ciphering related information IEs
    -- If the extension v380 is included use the extension for the ciphering status per CN domain
        cipheringStatus                 CipheringStatus,
        calculationTimeForCiphering     CalculationTimeForCiphering         OPTIONAL,
        cipheringInfoPerRB-List         CipheringInfoPerRB-List             OPTIONAL,
        count-C-List                    COUNT-C-List                        OPTIONAL,
        integrityProtectionStatus       IntegrityProtectionStatus,
        srb-SpecificIntegrityProtInfo   SRB-SpecificIntegrityProtInfoList,
        implementationSpecificParams    ImplementationSpecificParams        OPTIONAL,
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        c-RNTI                          C-RNTI                              OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability,
        ue-Positioning-LastKnownPos     UE-Positioning-LastKnownPos         OPTIONAL,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
        cn-DomainInformationList        CN-DomainInformationList            OPTIONAL,
    -- Measurement IEs
        ongoingMeasRepList              OngoingMeasRepList                  OPTIONAL,
    -- Radio bearer IEs
        predefinedConfigStatusList      PredefinedConfigStatusList,
        srb-InformationList             SRB-InformationSetupList,
        rab-InformationList             RAB-InformationSetupList            OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-TransChInfoList              UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                transChDRAC-Info                DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-TransChInfoList              DL-AddReconfTransChInfoList         OPTIONAL,
    -- Measurement report
        measurementReport               MeasurementReport                   OPTIONAL ,
        nonCriticalExtensions           SEQUENCE {
        -- In case of TDD only this IE is present otherwise this IE is absent
            up-Ipdl-Parameters-TDD          UE-Positioning-IPDL-Parameters-TDD-r4-ext   OPTIONAL,
        -- Extension mechanism for non- release4 information
            nonCriticalExtensions           SEQUENCE {}                                 OPTIONAL
        }                                                                   OPTIONAL
}

SRNC-RelocationInfo-v380ext-IEs ::= SEQUENCE {
    -- Ciphering related information IEs
        cn-DomainIdentity                   CN-DomainIdentity,
        cipheringStatusList                 CipheringStatusList
}

SRNC-RelocationInfo-v390ext-IEs ::= SEQUENCE {
        cn-DomainInformationList-v390ext    CN-DomainInformationList-v390ext        OPTIONAL,
        ue-RadioAccessCapability-v370ext    UE-RadioAccessCapability-v370ext        OPTIONAL,
        ue-RadioAccessCapability-v380ext    UE-RadioAccessCapability-v380ext        OPTIONAL,
        dl-PhysChCapabilityFDD-v380ext      DL-PhysChCapabilityFDD-v380ext,
        failureCauseWithProtErr             FailureCauseWithProtErr                 OPTIONAL
}

CipheringStatusList ::=         SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        CipheringStatusCNdomain

CipheringStatusCNdomain ::=             SEQUENCE {
        cn-DomainIdentity               CN-DomainIdentity,
        cipheringStatus                 CipheringStatus
```

```
}

SRNC-RelocationInfo-r4 ::=          SEQUENCE {
    -- Non-RRC IEs
        stateOfRRC                      StateOfRRC,
        stateOfRRC-Procedure            StateOfRRC-Procedure,
        cipheringStatus                 CipheringStatus,
        calculationTimeForCiphering     CalculationTimeForCiphering         OPTIONAL,
        cipheringInfoPerRB-List         CipheringInfoPerRB-List             OPTIONAL,
        integrityProtectionStatus       IntegrityProtectionStatus,
        srb-SpecificIntegrityProtInfo   SRB-SpecificIntegrityProtInfoList,
        implementationSpecificParams    ImplementationSpecificParams        OPTIONAL,
    -- User equipment IEs
        u-RNTI                          U-RNTI,
        c-RNTI                          C-RNTI                              OPTIONAL,
        ue-RadioAccessCapability        UE-RadioAccessCapability,
        ue-Positioning-LastKnownPos     UE-Positioning-LastKnownPos         OPTIONAL,
    -- Other IEs
        ue-RATSpecificCapability        InterRAT-UE-RadioAccessCapabilityList   OPTIONAL,
    -- UTRAN mobility IEs
        ura-Identity                    URA-Identity                        OPTIONAL,
    -- Core network IEs
        cn-CommonGSM-MAP-NAS-SysInfo    NAS-SystemInformationGSM-MAP,
        cn-DomainInformationList        CN-DomainInformationList            OPTIONAL,
    -- Measurement IEs
        ongoingMeasRepList              OngoingMeasRepList-r4               OPTIONAL,
    -- Radio bearer IEs
        predefinedConfigStatusList      PredefinedConfigStatusList,
        srb-InformationList             SRB-InformationSetupList,
        rab-InformationList             RAB-InformationSetupList            OPTIONAL,
    -- Transport channel IEs
        ul-CommonTransChInfo            UL-CommonTransChInfo                OPTIONAL,
        ul-TransChInfoList              UL-AddReconfTransChInfoList         OPTIONAL,
        modeSpecificInfo                CHOICE {
            fdd                             SEQUENCE {
                cpch-SetID                      CPCH-SetID                  OPTIONAL,
                transChDRAC-Info                DRAC-StaticInformationList  OPTIONAL
            },
            tdd                             NULL
        },
        dl-CommonTransChInfo            DL-CommonTransChInfo                OPTIONAL,
        dl-TransChInfoList              DL-AddReconfTransChInfoList         OPTIONAL,
    -- Measurement report
        measurementReport               MeasurementReport                   OPTIONAL,
        nonCriticalExtensions           SEQUENCE {
        -- In case of TDD only this IE is present otherwise this IE is absent
            up-Ipdl-Parameters-TDD          UE-Positioning-IPDL-Parameters-TDD-r4-ext   OPTIONAL,
        -- Extension mechanism for non- release4 information
            nonCriticalExtensions           SEQUENCE {}                             OPTIONAL
        }                                                                   OPTIONAL
}

-- IE definitions

CalculationTimeForCiphering ::=     SEQUENCE {
    cell-Id                             CellIdentity,
    sfn                                 INTEGER (0..4095)
}

CipheringInfoPerRB ::=              SEQUENCE {
    dl-HFN                              BIT STRING (SIZE (20..25)),
    ul-HFN                              BIT STRING (SIZE (20..25))
}

-- TABULAR: Multiplicity value numberOfRadioBearers has been replaced
-- with maxRB.
CipheringInfoPerRB-List ::=         SEQUENCE (SIZE (1..maxRB)) OF
                                        CipheringInfoPerRB

CipheringStatus ::=                 ENUMERATED {
                                        started, notStarted }

CN-DomainInformation-v390ext ::=        SEQUENCE {
    cn-DRX-CycleLengthCoeff             CN-DRX-CycleLengthCoefficient
}

CN-DomainInformationList-v390ext ::=    SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        CN-DomainInformation-v390ext
```

```
COUNT-C-List ::=                        SEQUENCE (SIZE (1..maxCNdomains)) OF
                                        COUNT-CSingle

COUNT-CSingle ::=                       SEQUENCE {
    cn-DomainIdentity                   CN-DomainIdentity,
    count-C                             BIT STRING (SIZE (32))
}

ImplementationSpecificParams ::=    BIT STRING (SIZE (1..512))


IntegrityProtectionStatus ::=       ENUMERATED {
                                        started, notStarted }

MeasurementCommandWithType ::=      CHOICE {
    setup                               MeasurementType,
    modify                              NULL,
    release                             NULL
}

MeasurementCommandWithType-r4 ::=   CHOICE {
    setup                               MeasurementType-r4,
    modify                              NULL,
    release                             NULL
}

OngoingMeasRep ::=                  SEQUENCE {
    measurementIdentity         MeasurementIdentity,
    measurementCommandWithType          MeasurementCommandWithType,
    -- TABULAR: The CHOICE Measurement in the tabular description is included
    -- in the IE above.
    measurementReportingMode            MeasurementReportingMode            OPTIONAL,
    additionalMeasurementID-List        AdditionalMeasurementID-List        OPTIONAL
}

OngoingMeasRep-r4 ::=               SEQUENCE {
    measurementIdentity         MeasurementIdentity,
    measurementCommandWithType          MeasurementCommandWithType-r4,
    -- TABULAR: The CHOICE Measurement in the tabular description is included
    -- in the IE above.
    measurementReportingMode            MeasurementReportingMode            OPTIONAL,
    additionalMeasurementID-List        AdditionalMeasurementID-List        OPTIONAL
}

OngoingMeasRepList ::=              SEQUENCE (SIZE (1..maxNoOfMeas)) OF
                                        OngoingMeasRep

OngoingMeasRepList-r4 ::=           SEQUENCE (SIZE (1..maxNoOfMeas)) OF
                                        OngoingMeasRep-r4

SRB-SpecificIntegrityProtInfo ::=   SEQUENCE {
    ul-RRC-HFN                          BIT STRING (SIZE (28)),
    dl-RRC-HFN                          BIT STRING (SIZE (28)),
    ul-RRC-SequenceNumber               RRC-MessageSequenceNumber,
    dl-RRC-SequenceNumber               RRC-MessageSequenceNumber
}

SRB-SpecificIntegrityProtInfoList ::= SEQUENCE (SIZE (4..maxSRBsetup)) OF
                                        SRB-SpecificIntegrityProtInfo

StateOfRRC ::=                      ENUMERATED {
                                        cell-DCH, cell-FACH,
                                        cell-PCH, ura-PCH }

StateOfRRC-Procedure ::=            ENUMERATED {
                                        awaitNoRRC-Message,
                                        awaitRRC-ConnectionRe-establishmentComplete,
                                        awaitRB-SetupComplete,
                                        awaitRB-ReconfigurationComplete,
                                        awaitTransportCH-ReconfigurationComplete,
                                        awaitPhysicalCH-ReconfigurationComplete,
                                        awaitActiveSetUpdateComplete,
                                        awaitHandoverComplete,
                                        sendCellUpdateConfirm,
                                        sendUraUpdateConfirm,
                                        sendRrcConnectionReestablishment,
                                        otherStates
```

```
}

UE-Positioning-LastKnownPos ::=     SEQUENCE {
        sfn                             INTEGER (0..4095),
        cell-id                         CellIdentity,
        positionEstimate                PositionEstimate
}

END
```

12 Message transfer syntax

Transfer syntax for RRC PDUs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned as specified in X.691 [49], and with adapted final padding. If special encoding is used, it is indicated in the ECN module defined for each ASN.1 module. The use of special encoding is defined in [14].

The following encoding rules apply in addition to what has been specified in X.691 [49]:

- When a bit string value is placed in a bit-field as specified in 15.6 to 15.11 in [11], the leading bit of the bitstring value shall be placed in the leading bit of the bit-field, and the trailing bit of the bitstring value shall be placed in the trailing bit of the bit-field.

NOTE: The terms "leading bit" and "trailing bit" are defined in ITU-T Rec. X.680 | ISO/IEC 8824-1. When using the "bstring" notation, the leading bit of the bit string value is on the left, and the trailing bit of the bit string value is on the right.

12.1 Structure of encoded RRC messages

An RRC PDU, which is the bit string that is exchanged between peer entities/ across the radio interface, is the concatenation of a basic production, an extension and padding, in that order.

RRC PDUs shall be mapped to and from RLC SDUs upon transmission and reception as follows:

- when delivering an RRC PDU as an RLC SDU to the RLC layer for transmission, the first bit of the RRC PDU shall be represented as the first bit in the RLC SDU and onwards; and

- upon reception of an RLC SDU from the RLC layer, the first bit of the RLC SDU shall represent the first bit of the RRC PDU and onwards.

12.1.1 Basic production

The 'basic production' is obtained by applying UNALIGNED PER to the abstract syntax value (the ASN.1 description) as specified in X.691, except for the 0 to 7 bits added at the end to produce a multiple of 8 bits. The basic production can have any positive number of bits, not necessarily a multiple of 8 bits.

12.1.2 Extension

Emitters compliant with this version of the specification of the protocol shall, unless indicated otherwise on a PDU type basis, set the extension part empty. Emitters compliant with a later version might send non-empty extensions.

12.1.3 Padding

Emitters compliant with this version of the specification of the protocol shall, unless indicated otherwise on a PDU type basis, pad the basic production with the smallest number of bits required to meet the size constraints of the lower layers. Padding bits shall be set to 0.

Receivers compliant with this version of the specification have no need to distinguish the extension and padding parts, and shall, unless indicated otherwise on a PDU type basis, accept RRC PDUs with any bit string in the extension and padding parts.

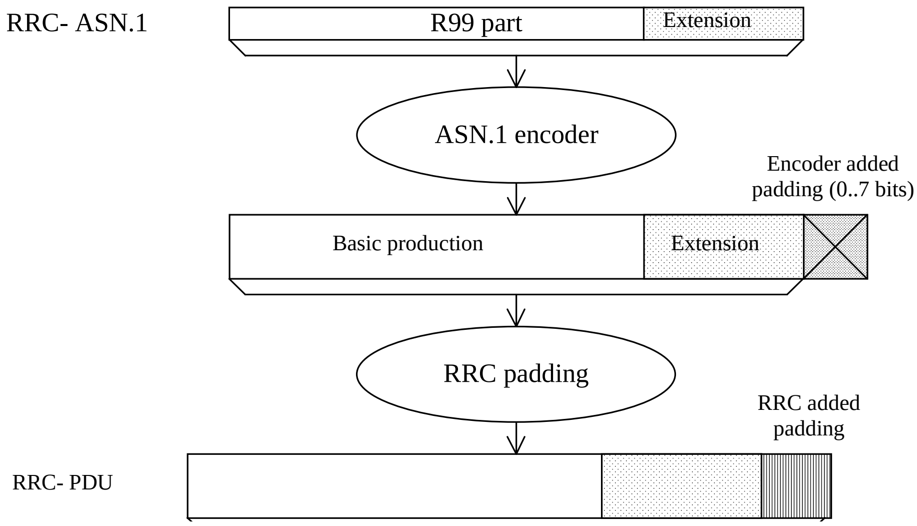


Figure 12.1.3-1: Padding

When using AM or UM mode, RLC requires that the RRC PDU length is a multiple of 8 bits.

When using Tr mode, RLC does neither impose size requirements nor perform padding. This implies that RRC has to take into account the transport format set defined for the transport channel across which the message is to be sent. RRC shall select the smallest transport format that fits the RRC PDU and shall add the lowest number of padding bits required to fit the size specified for the selected transport format.

For system information blocks, building the PDU involves two steps. The first step is the building of the SIBs, in which step padding is not applied (the rules for extension apply). The second step is the building of the RRC PDUs, involving segmentation and concatenation of SIBs, and then padding as described above for Tr mode. The procedure is shown by means of an example as described in Figure 12.1.3-2. The example includes two SIBs, SIBn and SIBn+1, of which only SIBn includes a protocol extension. The two SIBS used in the example don't require segmentation and are concatenated into one SYSTEM INFORMATION message.

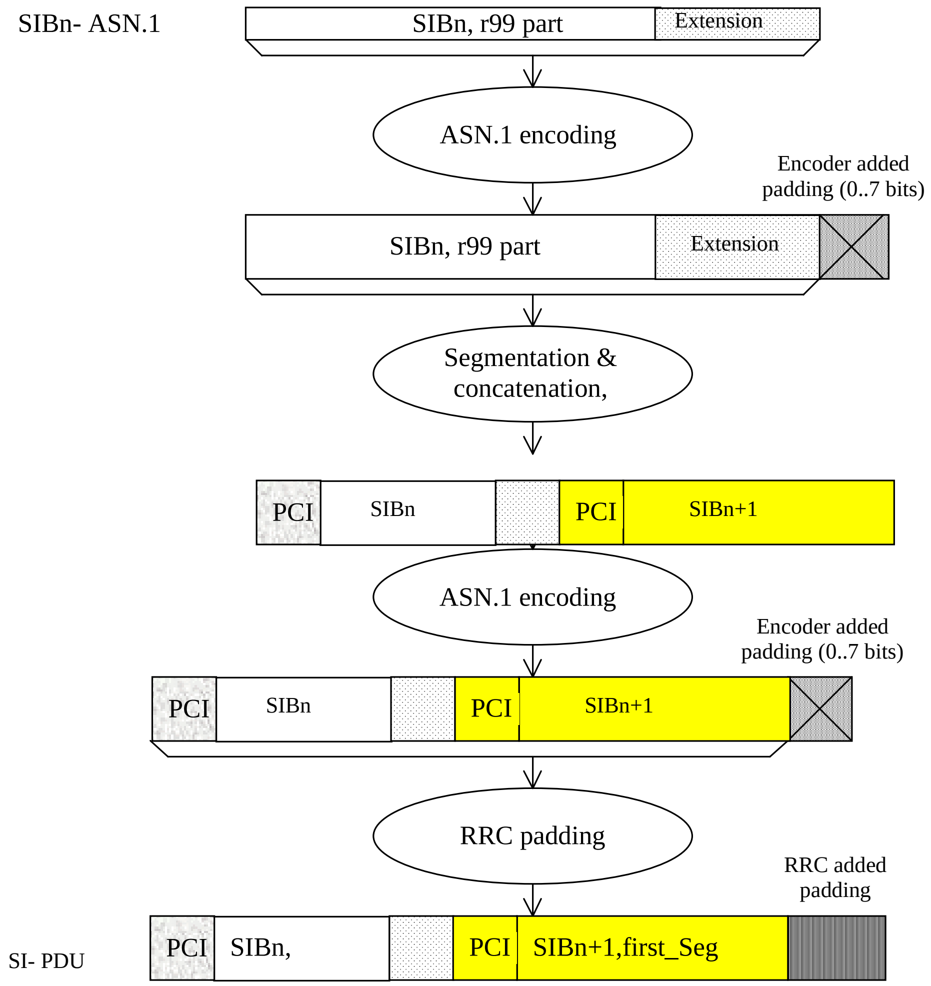


Figure 12.1.3-2: Padding for System Information

PCI: Protocol control information at SYSTEM INFORMATION message level

SI: SYSTEM INFORMATION message

For system information blocks, RRC may also add padding information at the end of IE "SIB data fixed", used both within IE "Last segment" and IE "Complete SIB". The IE "SIB data fixed" has a fixed length i.e. no length denominator used. In case the remaining amount of "SIB data" information is insufficient to fill the IE completely, RRC includes padding bits.

Since no length denominator is included, the receiving RRC cannot remove the padding added by the sender. However, since the padding used is the same as the padding added by the PER encoder to achieve octet alignment, the receiver can handle it.

NOTE 1 The mechanism described above implies that the PDU provided to the ASN.1 decoder may have more than 7 padding bits included. For a complete SIB of length 215 bits, 11 padding bits are added by RRC. Since the decoder requires an octet aligned input, 6 additional bits need to be added. In this (worst) case, a total of 17 padding bits is included.

NOTE 2 For the above cases, use of padding bits is possible and more efficient than including a length denominator.

When using the RRC padding described above, the segment has a fixed length, which completely fills the transport block. Therefore, in this case no RRC padding is added within the SYSTEM INFORMATION message. This is illustrated by means of the following figure.

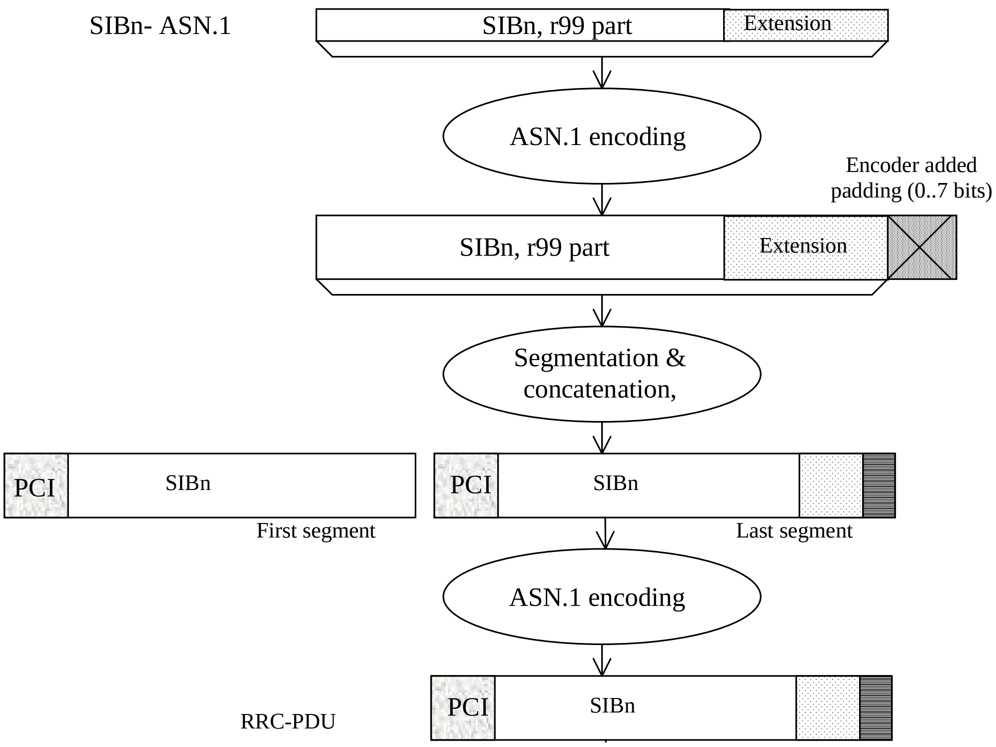


Figure 12.1.3-3: No RRC padding for System Information

12.2 ECN link module for RRC

```
RRC-ECN-Link-Module LINK-DEFINITIONS ::=
BEGIN

IMPORTS
    RRC-encodings               -- Encoding objects for RRC messages
FROM RRC-Encoding-Definitions;

ENCODE Class-definitions
    WITH RRC-encodings
    COMPLETED BY PER-BASIC-UNALIGNED

ENCODE PDU-definitions
    WITH RRC-encodings
    COMPLETED BY PER-BASIC-UNALIGNED

ENCODE InformationElements
    WITH RRC-encodings
    COMPLETED BY PER-BASIC-UNALIGNED

ENCODE Internode-definitions
    WITH RRC-encodings
    COMPLETED BY PER-BASIC-UNALIGNED

END
```

12.3 ECN modules for RRC

The encoding definition module "RRC-Encoding-Definitions" contains definition of the encoding object set "RRC-encodings". The encoding object set contains all the specialized encoding for RRC.

```
RRC-Encoding-Definitions ENCODING-DEFINITIONS ::=

BEGIN

EXPORTS
    RRC-encodings;

RRC-encodings #ENCODINGS ::= {
    -- Trailing bits
    outer-encoding
}

--**************************************************************
--
-- The trailing bits in all RRC messages shall be ignored
-- (including unknown message contents & unknown extensions).
-- This overrides the default PER behaviour which pads the last
-- octet with zero bits.
--
--**************************************************************

outer-encoding #OUTER ::= {
    ENCODER-DECODER {
    }
    DECODE AS IF {
        POST-PADDING    encoder-option
    }
}

END

Class-definitions-ECN-Module ENCODING-DEFINITIONS ::=
BEGIN
END

PDU-definitions-ECN-Module ENCODING-DEFINITIONS ::=
BEGIN
END

InformationElements-ECN-Module ENCODING-DEFINITIONS ::=
BEGIN
END


Internode-definitions-ECN-Module ENCODING-DEFINITIONS ::=
BEGIN
END
```

13 Protocol timers, counters, other parameters and default configurations

The information provided in subclauses 13.1 and 13.2 shall be treated as informative. The normative text is specified in the relevant subclauses in clause 8 and clause 8 shall prevail.

13.1 Timers for UE

Timer	Start	Stop	At expiry
T300	Transmission of RRC CONNECTION REQUEST	Reception of RRC CONNECTION SETUP	Retransmit RRC CONNECTION REQUEST if V300 =< N300, else go to Idle mode
T302	Transmission of CELL UPDATE/URA UPDATE	Reception of CELL UPDATE CONFIRM/URA UPDATE CONFIRM	Retransmit CELL UPDATE/URA UPDATE if V302 =< N302, else, go to Idle mode
T304	Transmission of UE CAPABILITY INFORMATION	Reception of UE CAPABILITY INFORMATION CONFIRM	Retransmit UE CAPABILITY INFORMATION if V304 =< N304, else initiate a cell update procedure
T305	Entering CELL_FACH or URA_PCH or CELL_PCH state. Reception of CELL UDPATE CONFIRM/URA UPDATE CONFIRM.	Entering another state.	Transmit CELL UPDATE if T307 is not activated and the UE detects "in service area". Otherwise, if T307 is not active, start T307.
T307	When the timer T305 has expired and the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode
T308	Transmission of RRC CONNECTION RELEASE COMPLETE	Not stopped	Transmit RRC CONNECTION RELEASE COMPLETE if V308 <=N308, else go to idle mode.
T309	Upon reselection of a cell belonging to another radio access system from connected mode, or reception of CELL CHANGE ORDER FROM UTRAN message	Successful establishment of a connection in the new cell	Resume the connection to UTRAN
T310	Transmission of PUSCH CAPACITY REQUEST	Reception of PHYSICAL SHARED CHANNEL ALLOCATION	Transmit PUSCH CAPACITY REQUEST if V310 =< N310, else procedure stops.
T311	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with the CHOICE "*PUSCH allocation*" set to "PUSCH allocation pending".	Reception of PHYSICAL SHARED CHANNEL ALLOCATION message with CHOICE "*PUSCH allocation*" set to "PUSCH allocation assignment".	UE may initiate a PUSCH capacity request procedure.
T312	When the UE starts to establish dedicated CH	When the UE detects consecutive N312 "in sync" indication from L1.	The criteria for physical channel establishment failure is fulfilled
T313	When the UE detects consecutive N313 "out of sync" indication from L1.	When the UE detects consecutive N315 "in sync" indication from L1.	The criteria for Radio Link failure is fulfilled
T314	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T314 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.13

Timer	Start	Stop	At expiry
T315	When the criteria for radio link failure are fulfilled. The timer is started only if radio bearer(s) that are associated with T315 exist.	When the Cell Update procedure has been completed.	See subclause 8.3.1.14
T316	When the UE detects "out of service area" in URA_PCH or CELL_PCH state	When the UE detects "in service area".	Initiate cell update procedure if in service area is detected. Otherwise start timer T317, transit to CELL_FACH state and initiate cell update procedure when the UE detects "in service area".
T317	When the T316 expires or when in CELL_FACH state, the UE detects "out of service area".	When the UE detects "in service area".	Transit to idle mode

13.2 Counters for UE

Counter	Reset	Incremented	When reaching max value
V300	When initiating the procedure RRC connection establishment	Upon expiry of T300.	When V300 > N300, the UE enters idle mode.
V302	When initiating the procedure Cell update or URA update	Upon expiry of T302	When V302 > N302 the UE enters idle mode.
V304	When sending the first UE CAPABILITY INFORMATION message.	Upon expiry of T304	When V304 > N304 the UE initiates the Cell update procedure
V308	When sending the first RRC CONNECTION RELEASE COMPLETE message in a RRC connection release procedure.	Upon expiry of T308	When V308 > N308 the UE stops re-transmitting the RRC CONNECTION RELEASE COMPLETE message.
V310	When sending the first PUSCH CAPACITY REQUEST message in a PUSCH capacity request procedure	Upon expiry of T310	When V310 > N310 the UE stops re-transmitting the PUSCH CAPACITY REQUEST message.

13.3 UE constants and parameters

Constant	Usage
N300	Maximum number of retransmissions of the RRC CONNECTION REQUEST message
N302	Maximum number of retransmissions of the CELL UPDATE / URA UPDATE message
N304	Maximum number of retransmissions of the UE CAPABILITY INFORMATION message
N308	Maximum number of retransmissions of the RRC CONNECTION RELEASE COMPLETE message
N310	Maximum number of retransmission of the PUSCH CAPACITY REQUEST message
N312	Maximum number of successive "in sync" received from L1.
N313	Maximum number of successive "out of sync" received from L1.
N315	Maximum number of successive "in sync" received from L1 during T313 is activated.

13.4 UE variables

13.4.0 CELL INFO LIST

This variable contains cell information on intra-frequency, inter-frequency and inter-RAT cells, as received in messages System Information Block Type 11, System Information Block Type 12, and MEASUREMENT CONTROL.

The first position in Intra-frequency cell info list corresponds to Intra-frequency cell id 0, the second to Intra-frequency cell id 1, etc.

The first position in Inter-frequency cell info list corresponds to Inter-frequency cell id 0, the second to Inter-frequency cell id 1, etc.

The first position in Inter-RAT cell info list corresponds to Intra-frequency cell id 0, the second to Inter-RAT cell id 1, etc.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Intra-frequency cell info	OP	1..<maxCellMeas>		Note
>CHOICE *position status*	MP			
>>Occupied				
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-frequency cell info	OP	1..<maxCellMeas>		Note
>CHOICE *position status*	MP			
>>Occupied				
>>>Frequency info	MP		Frequency info 10.3.6.36	
>>>Cell info	MP		Cell info 10.3.7.2	
>>Vacant				No data
Inter-RAT cell info	OP	1..<maxCellMeas>		Note
>CHOICE *position status*	MP			
>>Occupied				
>>>CHOICE *Radio Access Technology*				
>>>>GSM				
>>>>>Cell selection and re-selection info	MP		Cell selection and re-selection info for SIB11/12 10.3.2.4	
>>>>>BSIC	MP		BSIC 10.3.8.2	
>>>>>BCCH ARFCN	MP		Integer (0..1023)	[43]
>>>>IS-2000				
>>>>>System specific measurement info			enumerated (frequency, timeslot, colour code, output power, PN offset)	For IS-2000, use fields from TIA/EIA/IS-2000.5, subclause 3. 7.3.3.2.27, *Candidate Frequency Neighbour List Message*
>>Vacant				No data

NOTE: This IE shall be cleared when entering UTRA RRC connected mode, when leaving UTRA RRC connected mode, when switched off as well as at selection of a new PLMN.

13.4.00 Void

13.4.0a CELL_UPDATE_STARTED

This variable indicates whether a cell update or URA update procedure is in progress.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Cell update started	MP		Boolean	TRUE means a cell or URA update procedure is in progress. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

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.

13.4.2 Void

13.4.2a CONFIGURATION_INCOMPLETE

This variable indicates whether a received measurement control message contains invalid an incomplete measurement configuration.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Configuration incomplete	MP		Boolean	TRUE: An incomplete configuration has been detected. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.3 C_RNTI

This variable stores the assigned C-RNTI for this UE when in CELL_FACH state.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
C-RNTI	OP		C-RNTI 10.3.3.8	Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared when leaving UTRA RRC connected mode.

13.4.4 DOFF

This variable contains the default offset value in the UE. See [10] for details.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Default DPCH Offset Value (DOFF)	OP		Default DPCH Offset Value 10.3.6.16	Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared 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..<maxSubflow count>)	Reference to the RAB subflow implemented by this RB
>>RB started	MD		Enumerated(stopped,	Default value is started

Information Element/Group name	Need	Multi	Type and reference	Semantics description
			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

13.4.5a ESTABLISHED_SIGNALLING_CONNECTIONS

This variable is used to store information about established signalling connections.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Signalling connection list	OP	1 to <maxCNdomains>		For each established signalling connection. Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared when leaving UTRA RRC connected mode.
>Signalling connection identity	MP		CN domain identity 10.3.1.1	

13.4.6 ESTABLISHMENT_CAUSE

This variable is used to store the cause for establishment of a signalling connection received by upper layers, to be used at RRC connection establishment.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Establishment cause	OP		Establishment cause 10.3.3.11	Cleared when leaving UTRA RRC connected mode.

13.4.7 FAILURE_CAUSE

This variable contains the cause for failure of a UE initiated procedure, to be reported in a retransmitted message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Failure cause	OP		Failure cause 10.3.3.13	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.

13.4.8 FAILURE_INDICATOR

This variable indicates whether the procedure has failed for a UE initiated procedure.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Failure indicator	MP		Boolean	TRUE: Procedure has failed. Set to FALSE when entering UTRA RRC connected mode. Set to FALSE when leaving UTRA RRC connected mode.

13.4.8.0 H_RNTI

This variable stores the assigned H-RNTI for this UE when in CELL-DCH state and a HS-DSCH transport channel has been allocated.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
H-RNTI	OP		H-RNTI 10.3.3.d	Cleared when entering UTRA RRC connected mode when not otherwise stated in the procedure. Cleared when leaving UTRA RRC connected mode.

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.

3GPP TSG-RAN WG2 meeting #27
Orlando, Florida, February 18th – 22nd, 2002

Tdoc R2-020559

CR-Form-v4

CHANGE REQUEST

⌘	**25.321**	**CR**	**104**	⌘	ev	**r2**	⌘	Current version: **4.3.0** ⌘

*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:	⌘	Introduction of HSDPA		
Source:	⌘	TSG-RAN WG2		
Work item code:	⌘	HSDPA-L23	***Date:*** ⌘	2002-02-24
Category:	⌘	**B** *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.	***Release:*** ⌘	REL-5 *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:	⌘	Addition of HSDPA functionality
Summary of change:	⌘	The document have been updated according to discussions at WG2#26. Offline email comments taken into account. Document updated after discussions at WG2 #27
Consequences if not approved:	⌘	-

Clauses affected:	⌘	3.2, 4.2.1, 4.2.3, 4.2.3.2, 4.2.3.3 (new), 4.2.4, 4.2.4.1, 4.2.4.2, 4.2.4.3 (new), 4.3.1, 6.1, 6.2.1, 6.2.2, 9.1.2, 9.1.3 (new), 9.1.4 (new), 9.2.1, 9.2.1.1, 9.2.1.1a (new), 9.2.1.2, 9.2.1.4, 9.2.1.5, 9.2.1.6, 9.2.2 (new), 9.2.2.1 (new), 10, 11.5 (new), 11.5.1 (new), 11.5.1.1 (new), 11.5.1.2 (new), 11.5.1.3 (new), 11.5.2 (new), 11.5.2.1 (new), 11.5.2.2 (new), 11.5.2.3 (new), 11.5.2.3.1 (new), 11.5.2.4 (new)		
Other specs affected:	⌘	[ ] Other core specifications [ ] 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.

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the MAC protocol.

The specification describes:

- MAC architecture;
- MAC entities;
- channel structure;
- services provided to upper layers;
- MAC functions;
- services expected from the physical layer;
- elements for layer-to-layer communication including primitives between MAC and RLC;
- elements for peer-to-peer communication;
- protocol data units, formats and parameters;
- elementary procedures.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 25.301: "Radio Interface Protocol Architecture".

[3] 3GPP TS 25.302: "Services provided by the Physical Layer".

[4] 3GPP TS 25.303: "Interlayer Procedures in Connected Mode".

[5] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[6] 3GPP TS 25.322: "RLC Protocol Specification".

[7] 3GPP TS 25.331: "RRC Protocol Specification".

[8] 3GPP TR 25.921: "Guidelines and Principles for Protocol Description and Error Handling".

[9] 3GPP TR 25.990: "Vocabulary for the UTRAN".

[10] 3GPP TS 33.102: "Security architecture".

[11] 3GPP TS 25.425: "UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams".

[12] 3GPP TS 25.133: "Requirements for support of radio resource management".

[13] 3GPP TS 25.214: "Physical layer procedures (FDD)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [9] and [1] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ASC	Access Service Class
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
C-	Control-
CCCH	Common Control Channel
CPCH	Common Packet Channel (UL)
DCCH	Dedicated Control Channel
DCH	Dedicated Channel
DL	Downlink
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Link Access Channel
FDD	Frequency Division Duplex
HARQ	Hybrid Automatic Repeat Request
HS-DSCH	High Speed Downlink Shared Channel
L1	Layer 1 (physical layer)
L2	Layer 2 (data link layer)
L3	Layer 3 (network layer)
MAC	Medium Access Control
PCCH	Paging Control Channel
PCH	Paging Channel
PDU	Protocol Data Unit
PHY	Physical layer
PhyCH	Physical Channels
RACH	Random Access Channel
RLC	Radio Link Control
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNTI	Radio Network Temporary Identity
RRC	Radio Resource Control
SAP	Service Access Point
SDU	Service Data Unit
SHCCH	Shared Channel Control Channel
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
TDD	Time Division Duplex
TFCI	Transport Format Combination Indicator
TFI	Transport Format Indicator
TSN	Transmission Sequence Number
U-	User-
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
USCH	Uplink Shared Channel

UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

4 General

4.1 Objective

The objective is to describe the MAC architecture and the different MAC entities from a functional point of view.

4.2 MAC architecture

The description in this subclause is a model and does not specify or restrict implementations.

According to the RRC functions the RRC is generally in control of the internal configuration of the MAC.

4.2.1 MAC Entities

The diagrams that describe the MAC architecture are constructed from MAC entities.

The entities are assigned the following names.

- MAC-b is the MAC entity that handles the following transport channels:
  - broadcast channel (BCH)
- MAC-c/sh, is the MAC entity that handles the following transport channels:
  - paging channel (PCH)
  - forward access channel (FACH)
  - random access channel (RACH)
  - common packet channel (UL CPCH). The CPCH exists only in FDD mode.
  - downlink shared channel (DSCH)
  - uplink shared channel (USCH). The USCH exists only in TDD mode.
- MAC-d is the MAC entity that handles the following transport channels:
  - dedicated transport channel~~s~~ (DCH)
- MAC-hs is the MAC entity that handles the following transport channels:
  - high speed downlink shared channel (HS-DSCH);

The exact functions completed by the entities are different in the UE from those completed in the UTRAN.

NOTE: When a UE is allocated resources for exclusive use by the bearers that it supports the MAC-d entities dynamically share the resources between the bearers and are responsible for selecting the TFI/ TFCI that is to be used in each transmission time interval.

4.2.2 MAC-b

The following diagram illustrates the connectivity of the MAC-b entity in a UE and in each cell of the UTRAN.

MAC-b represents the control entity for the broadcast channel (BCH).

There is one (current cell) or multiple (current and neighbour cells) MAC-b entities in each UE and one MAC-b in the UTRAN for each cell.

The MAC Control SAP is used to transfer Control information to MAC-b.

The MAC-b entity is located in the Node B.

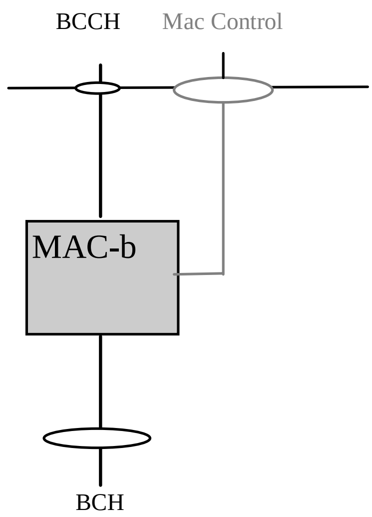


Figure 4.2.2.1: UE side and UTRAN side architecture

4.2.3 Traffic Related Architecture - UE Side

Figure 4.2.3.1 illustrates the connectivity of MAC entities.

The MAC-c/sh controls access to all common transport ~~.~~channels, except the HS-DSCH transport channel.

The MAC-d controls access to all dedicated transport channels, to MAC-c/sh and MAC-hs.

The MAC-hs controls access to the HS-DSCH transport channel.

In the downlink, if logical channels of dedicated type are mapped to common transport channels then MAC-d receives the data from MAC-c/sh or MAC-hs via the illustrated connection between the functional entities.

In the uplink, if logical channels of dedicated type are mapped to common transport channels then MAC-d submits the data to MAC-c/sh via the illustrated connection between the functional entities.

The mapping of logical channels on transport channels depends on the multiplexing that is configured by RRC.

The MAC Control SAP is used to transfer Control information to each MAC entity.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

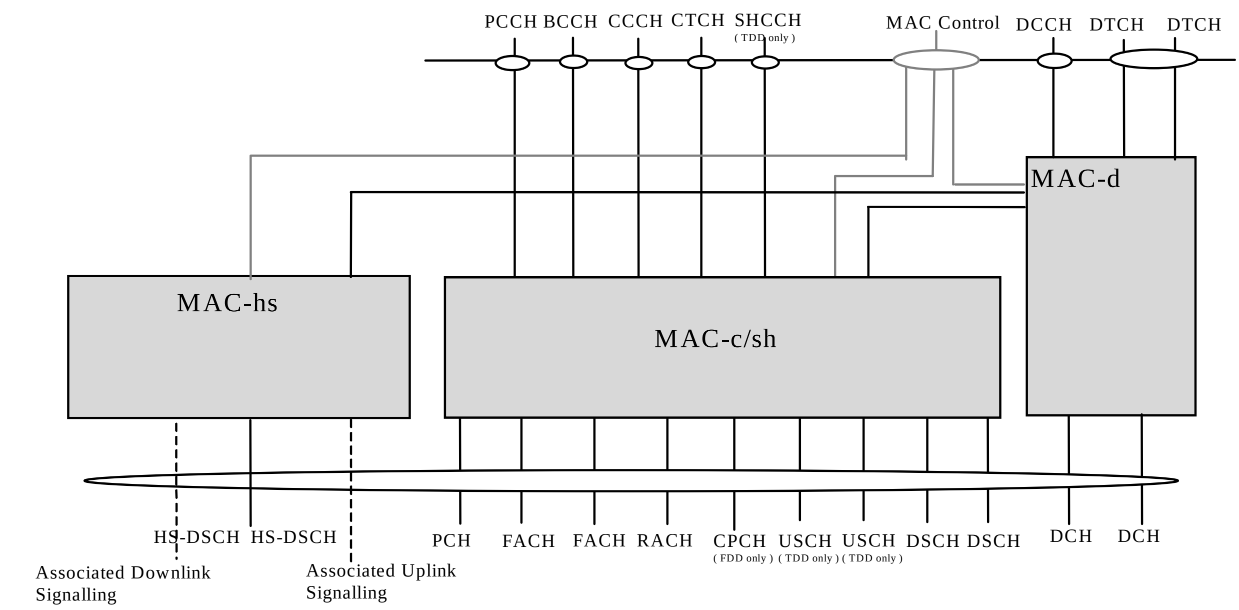


Figure 4.2.3.1: UE side MAC architecture

4.2.3.1 MAC-c/sh entity – UE Side

Figure 4.2.3.1.1 shows the UE side MAC-c/sh entity.

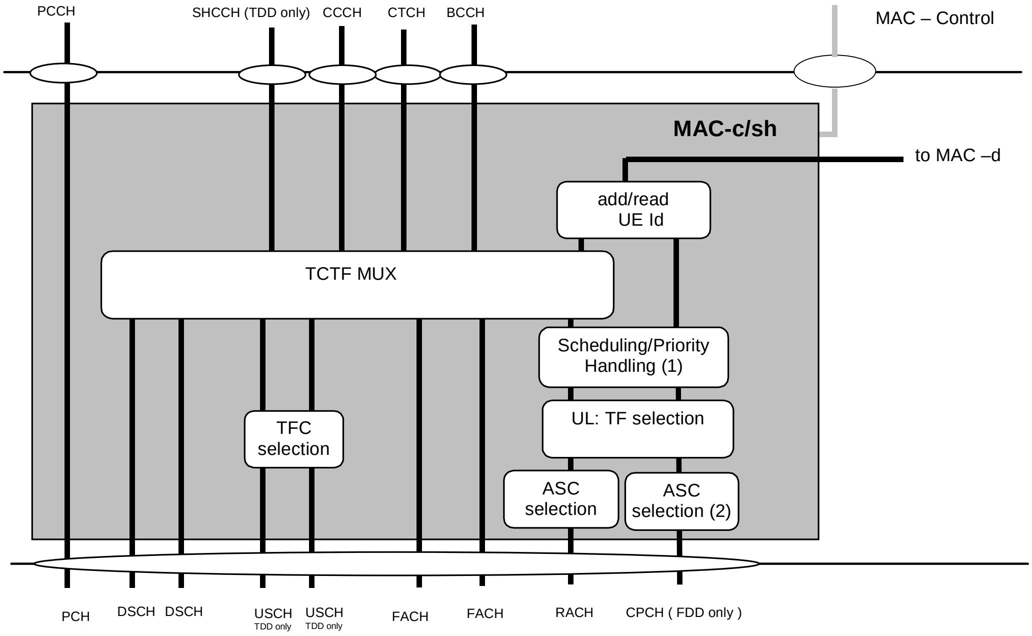
The following functionality is covered:

- TCTF MUX:
    - this function represents the handling (insertion for uplink channels and detection and deletion for downlink channels) of the TCTF field in the MAC header, and the respective mapping between logical and transport channels.
      The TCTF field indicates the common logical channel type, or if a dedicated logical channel is used;
- add/read UE Id:
    - the UE Id is added for CPCH and RACH transmissions
    - the UE Id, when present, identifies data to this UE.
- UL: TF selection:
    - in the uplink, the possibility of transport format selection exists.
      In case of CPCH transmission, a TF is selected based on TF availability determined from status information on the CSICH;
- ASC selection:
    - For RACH, MAC indicates the ASC associated with the PDU to the physical layer. For CPCH, MAC may indicate the ASC associated with the PDU to the Physical Layer. This is to ensure that RACH and CPCH messages associated with a given Access Service Class (ASC) are sent on the appropriate signature(s) and time slot(s). MAC also applies the appropriate back-off parameter(s) associated with the given ASC. When sending an RRC CONNECTION REQUEST message, RRC will determine the ASC; in all other cases MAC selects the ASC;
- scheduling /priority handling
    - this functionality is used to transmit the information received from MAC-d on RACH and CPCH based on logical channel priorities. This function is related to TF selection.

- TFC selection
  - transport format and transport format combination selection according to the transport format combination set (or transport format combination subset) configured by RRC is performed,

The RLC provides RLC-PDUs to the MAC, which fit into the available transport blocks on the transport channels.

There is one MAC-c/sh entity in each UE.



Note 1: Scheduling /Priority handling is applicable for CPCH.
Note 2: In case of CPCH, ASC selection may be applicable for AP preamble.

Figure 4.2.3.1.1: UE side MAC architecture / MAC-c/sh details

4.2.3.2 MAC-d entity – UE Side

Figure 4.2.3.2.1 shows the UE side MAC-d entity.

The following functionality is covered:

- Transport Channel type switching
  - Transport Channel type switching is performed by this entity, based on decision taken by RRC. This is related to a change of radio resources. If requested by RRC, MAC shall switch the mapping of one designated logical channel between common and dedicated transport channels.
- C/T MUX:
  - The C/T MUX is used when multiplexing of several dedicated logical channels onto one transport channel is used. An unambiguous identification of the logical channel is included.
- Ciphering:
  - Ciphering for transparent mode data to be ciphered is performed in MAC-d. Details about ciphering can be found in [10].
- Deciphering:
  - Deciphering for ciphered transparent mode data is performed in MAC-d. Details about ciphering can be found in [10].
- UL TFC selection:

- Transport format and transport format combination selection according to the transport format combination set (or transport format combination subset) configured by RRC is performed.

The MAC-d entity is responsible for mapping dedicated logical channels for the uplink either onto dedicated transport channels or to transfer data to MAC-c/sh to be transmitted via common channels.

One dedicated logical channel can be mapped simultaneously onto DCH and ;DSCH. One dedicated logical channel can be simultaneously mapped onto DCH and HS-DSCH.

The MAC-d entity has a connection to the MAC-c/sh entity. This connection is used to transfer data to the MAC-c/sh to transmit data on transport channels that are handled by MAC-c/sh (uplink) or to receive data from transport channels that are handled by MAC-c/sh (downlink).

The MAC-d entity has a connection to the MAC-hs entity. This connection is used to receive data from the HS-DSCH transport channel which is handled by MAC-hs (downlink).

There is one MAC-d entity in the UE.

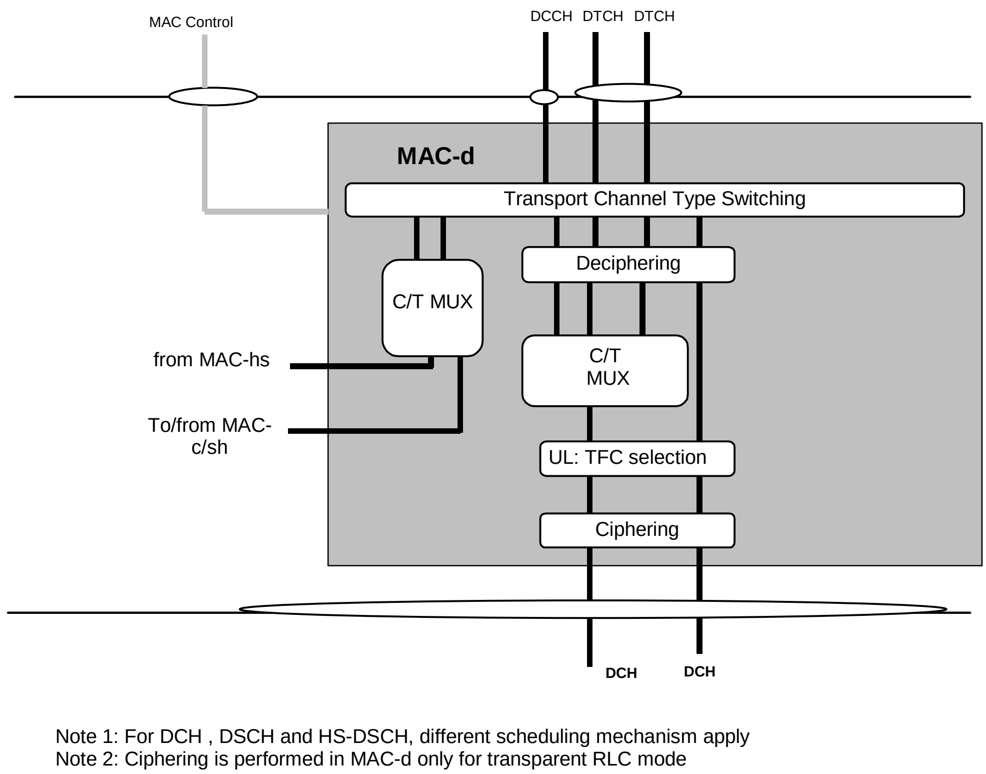


Figure 4.2.3.2.1: UE side MAC architecture / MAC-d details

4.2.3.3 MAC-hs entity – UE Side

The MAC-hs handles the HSDPA specific functions. In the model below the MAC-hs comprises the following entities:

- HARQ:
  The HARQ entity is responsible for handling the MAC functions relating to the HARQ protocol. The HARQ functional entity handles all the tasks that are required for hybrid ARQ. It is responsible for generating ACKs or NACKs. The detailed configuration of the hybrid ARQ protocol is provided by RRC over the MAC-Control SAP.

- Reordering Queue distribution.
  The reordering queue distribution function routes the MAC-hs PDUs to the correct reordering buffer based on the Queue ID.

- Reordering
  The reordering entity reorders received MAC-hs PDUs according to the received TSN. MAC-hs PDUs with consecutive TSNs are delivered to the disassembly function upon reception. MAC-hs PDUs are not delivered to the disassembly function if MAC-hs PDUs with lower TSN are missing. There is one reordering entity for each Queue ID configured at the UE.

- Disassembly: The disassembly entity is responsible for the disassembly of MAC-hs PDUs. When a MAC-hs PDU is disassembled the MAC-hs header is removed, the MAC-d PDUs are extracted and any present padding bits are removed. Then the MAC-d PDUs are delivered to higher layer.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

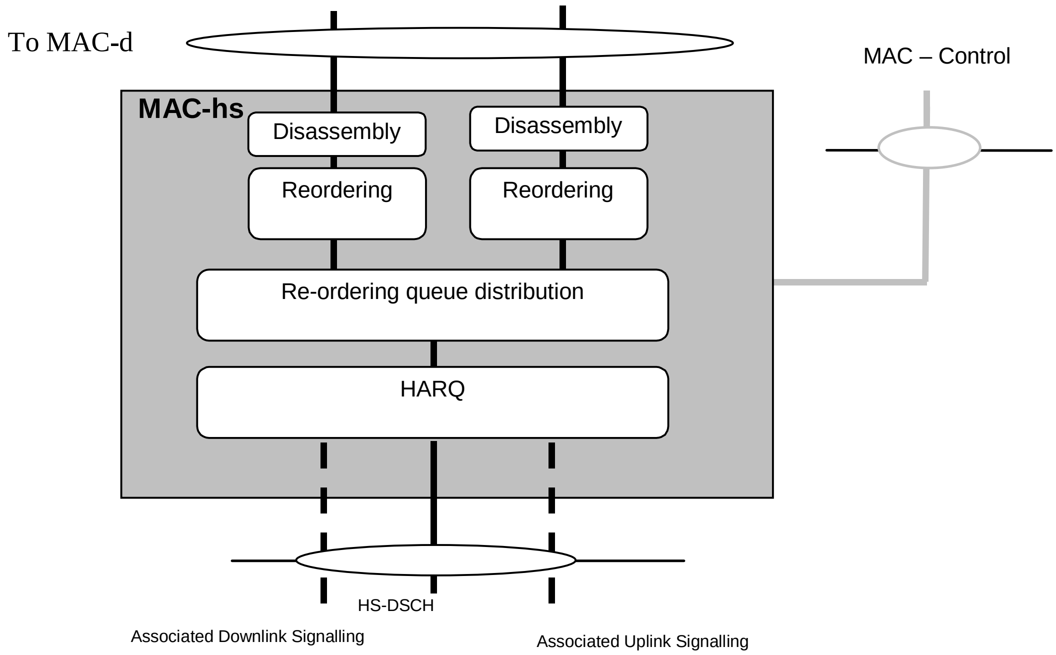
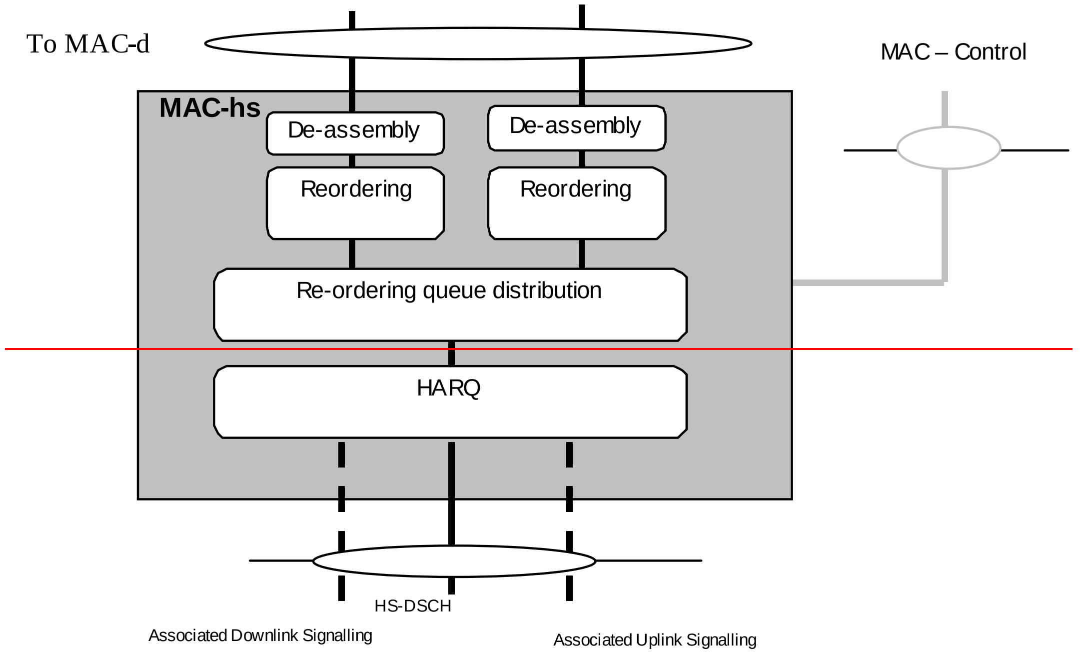


Figure x: UE side MAC architecture / MAC-hs details



4.2.4 Traffic Related Architecture - UTRAN Side

Figure 4.2.4.1 illustrates the connectivity between the MAC entities from the UTRAN side.

It is similar to the UE case with the exception that there will be one MAC-d for each UE and each UE (MAC-d) that is associated with a particular cell may be associated with that cell's MAC-c/sh.

MAC-c/sh is located in the controlling RNC while MAC-d is located in the serving RNC. MAC-hs is located in the Node B. The ~~MAC-hs SDUs~~ MAC-d PDUs to be transmitted are transferred from MAC-c/sh to the MAC-hs via the Iub interface in case of configuration with MAC-c/sh, or from the MAC-d via Iur/Iub in case of configuration without MAC-c/sh.

The MAC Control SAP is used to transfer Control information to each MAC entity ~~belongs~~belonging to one UE.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

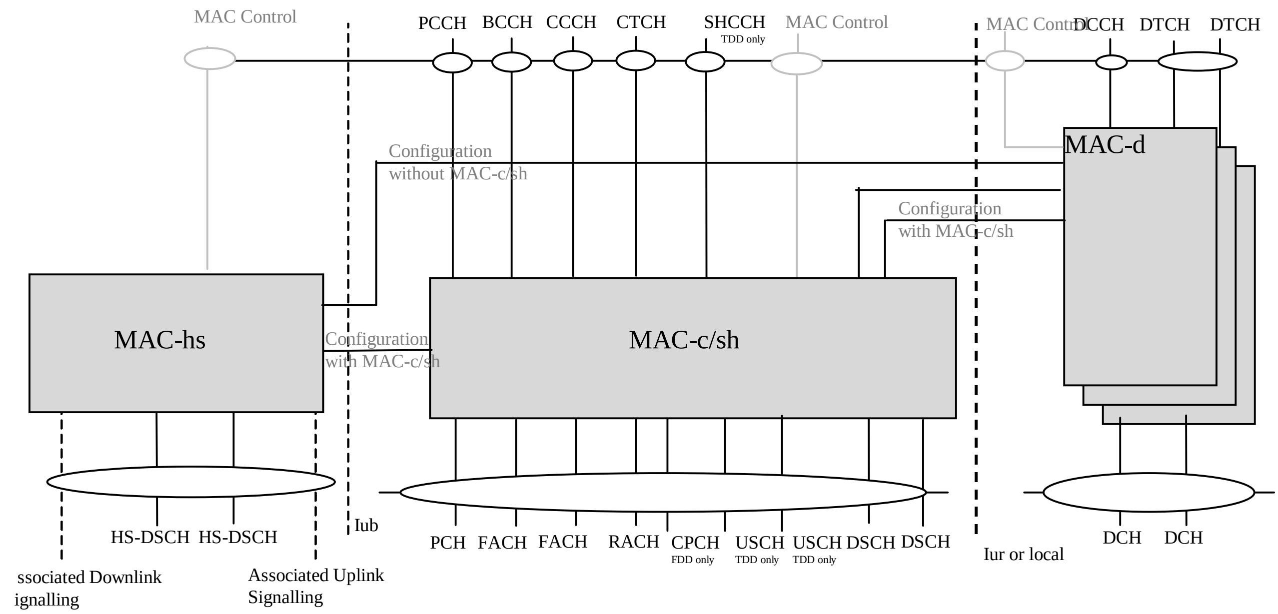


Figure 4.2.4.1: UTRAN side MAC architecture

4.2.4.1 MAC-c/sh entity – UTRAN Side

Figure 4.2.4.1.1 shows the UTRAN side MAC-c/sh entity. The following functionality is covered:

- ~~the~~ Scheduling – Priority Handling;
  - this function manages FACH and DSCH resources between the UEs and between data flows according to their priority.
- TCTF MUX
  - this function represents the handling (insertion for downlink channels and detection and deletion for uplink channels) of the TCTF field in the MAC header, and the respective mapping between logical and transport channels.
    The TCTF field indicates the common logical channel type, or if a dedicated logical channel is used;
- UE Id Mux;
  - for dedicated type logical channels, the UE Id field in the MAC header is used to distinguish between UEs;
- TFC selection:
  - in the downlink, transport format combination selection is done for FACH and PCH and DSCHs;
- ~~demultiplex;~~Demultiplex;
  - for TDD operation the demultiplex function is used to separate USCH data from different UEs, i.e. to be transferred to different MAC-d entities;
- DL code allocation;
  - this function is used to indicate the code used on the DSCH;

~~Flow control is provided to MAC-d.~~- Flow control;

  - a flow control function exists toward MAC-d to limit buffering between MAC-d and MAC-c/sh entities. a flow control function also exists towards MAC-hs in case of configuration with MAC-c/sh. ~~See Section 4.2.4.2~~.

The RLC provides RLC-PDUs to the MAC, which fit into the available transport blocks on the transport channels.

There is one MAC-c/sh entity in the UTRAN for each cell;

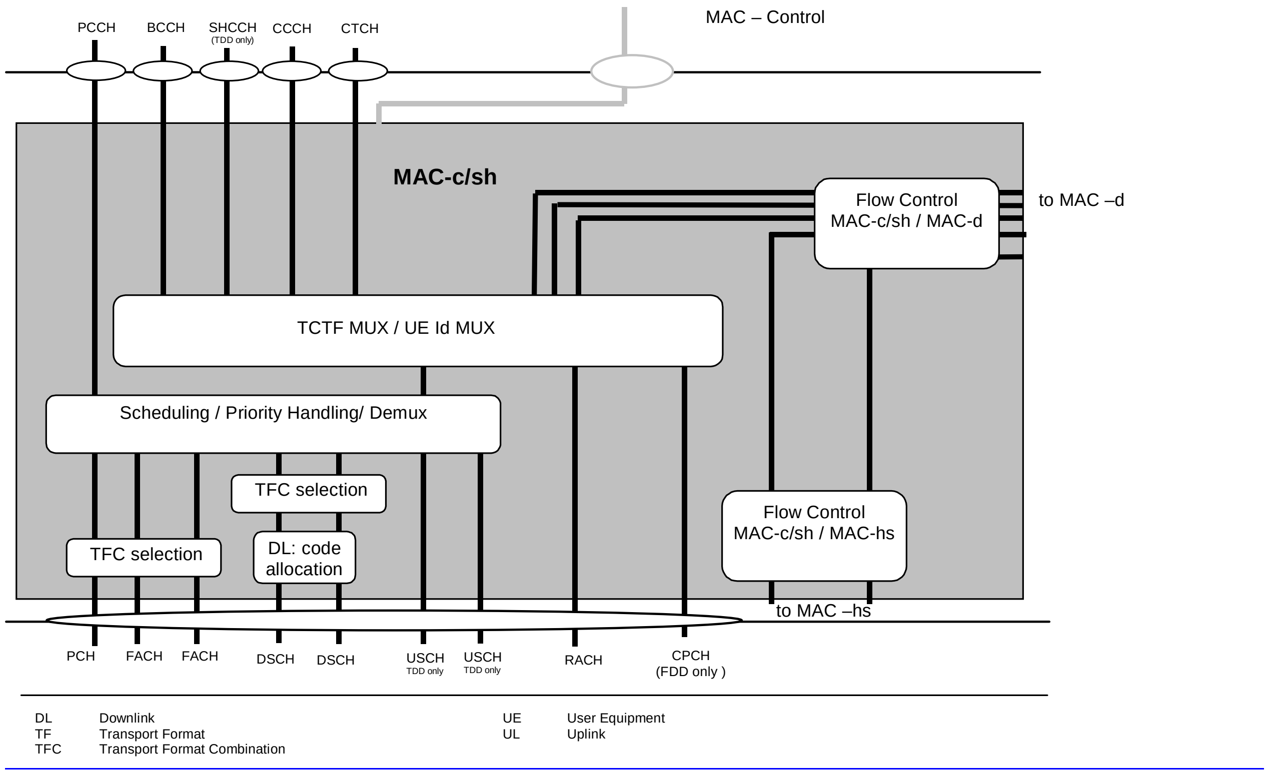


Figure 4.2.4.1.1: UTRAN side MAC architecture / MAC-c/sh details

4.2.4.2 MAC-d entity – UTRAN Side

Figure 4.2.4.2.1 shows the UTRAN side MAC-d entity.

The following functionality is covered:

- Transport Channel type switching:
  - Transport Channel type switching is performed by this entity, based on decision taken by RRC; this is related to a change of radio resources. If requested by RRC, MAC shall switch the mapping of one designated logical channel between common and dedicated transport channels.
- C/T MUX box;
  - the function includes the C/T field when multiplexing of several dedicated logical channels onto one transport channel is used.
- Priority setting;
  - This function is responsible for priority setting on data received from DCCH / DTCH;
- Ciphering;
  - Ciphering for transparent mode data to be ciphered is performed in MAC-d. Details about ciphering can be found in [10].
- Deciphering;
  - Deciphering for ciphered transparent mode data is performed in MAC-d. Details about ciphering can be found in [10].
- DL Scheduling/Priority handling;

  - in the downlink, scheduling and priority handling of transport channels is performed within the allowed transport format combinations of the TFCS assigned by the RRC.

- Flow Control;

  - a flow control function exists toward MAC-c/sh to limit buffering between MAC-d and MAC-c/sh entities. This function is intended to limit layer 2 signalling latency and reduce discarded and retransmitted data as a result of FACH or DSCH congestion. For the Iur interface this is specified in [11]. A flow control function also exists towards MAC-hs in case of configuration without MAC-c/sh, see Section 4.2.4.2.

A MAC-d entity using common channels other than the high speed downlink shared channel is connected to a MAC-c/sh entity that handles the scheduling of the common channels to which the UE is assigned and DL (FACH) priority identification to MAC-c/sh;

A MAC-d entity using downlink shared channel is connected to a MAC-c/sh entity that handles the shared channels to which the UE is assigned and indicates the level of priority of each PDU to MAC-c/sh;

A MAC-d entity using the high speed downlink shared channel may be connected to a MAC-c/sh entity that in turn is connected to the MAC-hs entity in the Node B (configuration with MAC-c/sh); alternately, a MAC-d entity using the high speed downlink shared channel may be connected to the MAC-hs entity in the Node B in case of configuration without MAC-c/sh.

A MAC-d entity is responsible for mapping dedicated logical channels onto the available dedicated transport channels or routing the data received on a DCCH or DTCH to MAC-c/sh or to MAC-hs. One dedicated logical channel can be mapped simultaneously on DCH and DSCH. Different scheduling mechanisms apply for DCH and DSCH. One dedicated logical channel can be mapped simultaneously on DCH and HS-DSCH.

There is one MAC-d entity in the UTRAN for each UE that has one or more dedicated logical channels to or from the UTRAN.

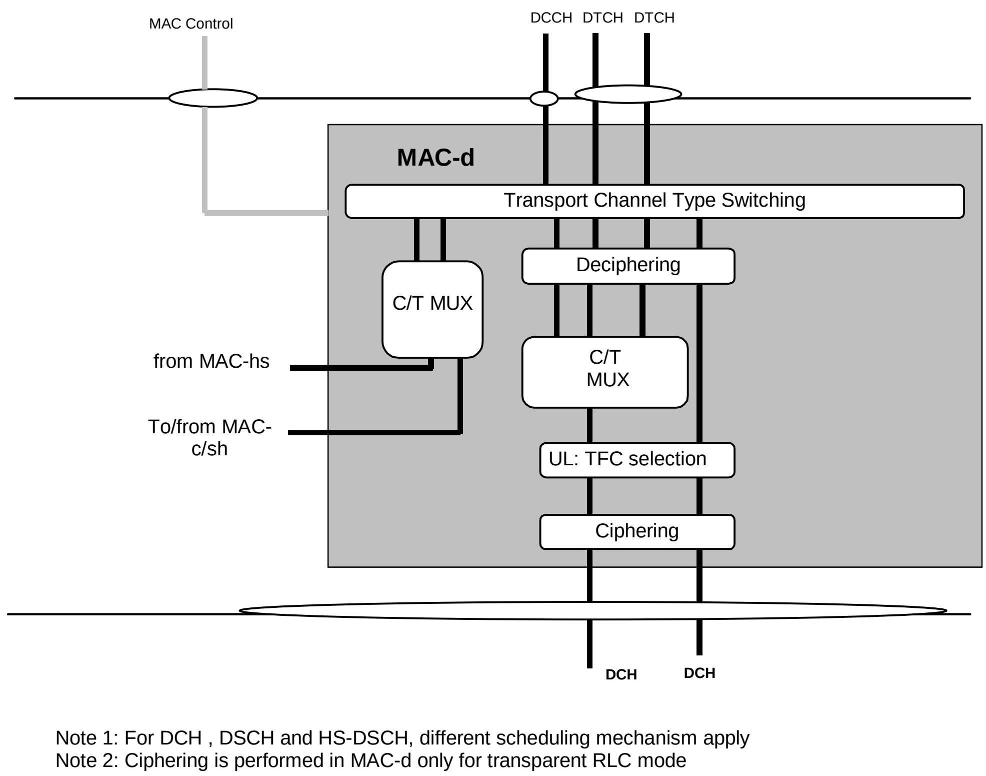


Figure 4.2.4.2.1: UTRAN side MAC architecture / MAC-d details

4.2.4.3 MAC-hs entity – UTRAN Side

There is one MAC-hs entity in the UTRAN for each cell that supports HS-DSCH transmission. The MAC-hs is responsible for handling the data transmitted on the HS-DSCH. Furthermore it is its responsibility to manage the physical resources allocated to HSDPA. MAC-hs receives configuration parameters from the RRC layer via the MAC-Control SAP. There shall be priority handling per MAC-d PDU in the MAC-hs. The MAC-hs is comprised of four different functional entities:

- Flow Control
  This is the companion flow control function to the flow control function in the MAC-c/sh in case of configuration with MAC-c/hs and MAC-d in case of configuration without MAC-c/hs. Both entities together provide a controlled data flow between the MAC-c/sh and the MAC-hs (Configuration with MAC-c/sh) or the MAC-d and MAC-hs (Configuration without MAC-c/hs) taking the transmission capabilities of the air interface into account in a dynamic manner. This function is intended to limit layer 2 signalling latency and reduce discarded and retransmitted data as a result of HS-DSCH congestion. Flow control is provided independently by MAC-d flow for a given MAC-hs entity.

- Scheduling/Priority Handling

  This function manages HS-DSCH resources between HARQ entities and data flows according to their priority. Based on status reports from associated uplink signalling either new transmission or retransmission is determined. Further it determines the Queue ID and TSN for each new MAC-hs PDU being serviced. A new transmission can be initiated instead of a pending retransmission at any time to support the priority handling

- HARQ
  One HARQ entity handles the hybrid ARQ functionality for one user. One HARQ entity is capable of supporting multiple instances (HARQ process) of stop and wait HARQ protocols. There shall be one HARQ process per HS-DSCH per TTI.

- TFRC selection
  Selection of an appropriate transport format and resource for the data to be transmitted on HS-DSCH.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

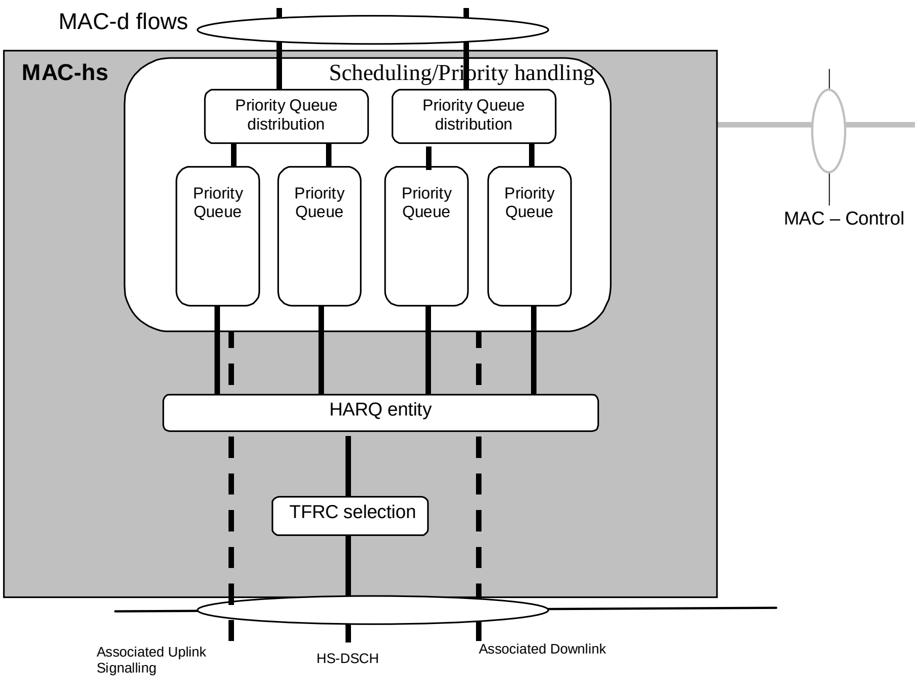


Figure x: UTRAN side MAC architecture / MAC-hs details

4.3 Channel structure

The MAC operates on the channels defined below; the transport channels are described between MAC and Layer 1, the logical channels are described between MAC and RLC.

The following subclauses provide an overview, the normative description can be found in [2] and [3] respectively.

4.3.1 Transport channels

Common transport channel types are:

- Random Access Channel(s) (RACH);
- Forward Access Channel(s) (FACH);
- Downlink Shared Channel(s) (DSCH);
- High Speed Downlink Shared Channel(s) (HS-DSCH);
- Common Packet Channel(s) (CPCH) for UL FDD operation only;
- Uplink Shared Channel(s) (USCH), for TDD operation only;
- Broadcast Channel (BCH);
- Paging Channel (PCH).

Dedicated transport channel types are:

- Dedicated Channel (DCH).

4.3.2 Logical Channels

The MAC layer provides data transfer services on logical channels. A set of logical channel types is defined for different kinds of data transfer services as offered by MAC.

Each logical channel type is defined by what type of information is transferred.

4.3.2.1 Logical channel structure

The configuration of logical channel types is depicted in figure 4.3.2.1.

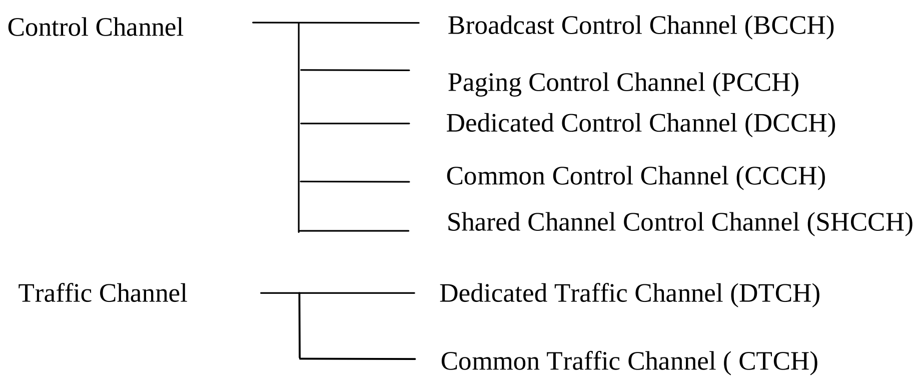


Figure 4.3.2.1: Logical channel structure

4.3.2.2 Control Channels

Following control channels are used for transfer of control plane information only:

- Broadcast Control Channel (BCCH);
- Paging Control Channel (PCCH);
- Common Control Channel (CCCH);
- Dedicated Control Channel (DCCH);
- Shared Channel Control Channel (SHCCH).

4.3.2.3 Traffic Channels

Following traffic channels are used for the transfer of user plane information only:

- Dedicated Traffic Channel (DTCH);
- Common Traffic Channel (CTCH).

5 Services provided to upper layers

This clause describes the different services provided by the MAC to higher layers. For a detailed description of the following functions see [2].

5.1 Description of Services provided to upper layers

- Data transfer: This service provides unacknowledged transfer of MAC SDUs between peer MAC entities without data segmentation.
- Reallocation of radio resources and MAC parameters: This service performs on request of RRC execution of radio resource reallocation and change of MAC parameters.
- Reporting of measurements: Local measurements are reported to RRC.

6 Functions

6.1 Description of the MAC functions

The functions of MAC include:

- mapping between logical channels and transport channels;
- selection of appropriate Transport Format for each Transport Channel depending on instantaneous source rate;
- priority handling between data flows of one UE;
- priority handling between UEs by means of dynamic scheduling;
- identification of UEs on common transport channels;
- multiplexing/demultiplexing of upper layer PDUs into/from transport blocks delivered to/from the physical layer on common transport channels;
- multiplexing/demultiplexing of upper layer PDUs into/from transport block sets delivered to/from the physical layer on dedicated transport channels;
- traffic volume measurement;
- Transport Channel type switching;
- ciphering for transparent mode RLC;

- Access Service Class selection for RACH and CPCH ~~transmission.~~transmission;
- control of HS-DSCH transmission and reception including support of HARQ.

6.2 Relation between MAC Functions and Transport Channels

6.2.1 Relation between MAC Functions and Transport Channels in UTRAN

Table 6.2.1.1: UTRAN MAC functions corresponding to the transport channel

Associated MAC Functions	Logical Ch	Transport Ch	TF Selection	Priority handling between UEs	Priority handling (one UE)	Scheduling	Identification of UEs	Mux/ Demux on common transport channels	Mux/ Demux on dedicated transport channels	HARQ support
Uplink (Rx)	CCCH	RACH						X		
	DCCH	RACH					X	X		
	DCCH	CPCH					X	X		
	DCCH	DCH							X	
	DTCH	RACH					X	X		
	DTCH	CPCH					X	X		
	DTCH	DCH							X	
	SHCCH	RACH					X	X		
	SHCCH	USCH						X		
	DTCH	USCH						X		
	DCCH	USCH						X		
Downlink (Tx)	BCCH	BCH				X				
	BCCH	FACH	X			X		X		
	PCCH	PCH	X			X				
	CCCH	FACH	X	X		X		X		
	CTCH	FACH	X			X		X		
	DCCH	FACH	X	X		X	X	X		
	DCCH	DSCH	X	X			X	X		
	DCCH	DCH	X		X				X	
	DCCH	HS-DSCH	X (1)	X	X	X	X	X		X
	DTCH	FACH	X	X		X	X	X		
	DTCH	DSCH	X	X			X	X		
	DTCH	DCH	X		X				X	
	DTCH	HS-DSCH	X (1)	X	X	X	X	X		X
	SHCCH	FACH	X	X		X		X		
	SHCCH	DSCH	X	X				X		

Note (1): In case of HS-DSCH the TF selection is replaced by TFRC selection.

6.2.2 Relation of MAC Functions and Transport Channels in UE

Table 6.2.2.1: UE MAC functions corresponding to the transport channel

Associated MAC Functions	Logical Ch	Transport Ch	TF Selection	Priority handling (one UE)	Identification	Mux/Demux on common transport channels	Mux/Demux on dedicated transport channels	HARQ support
Uplink (Tx)	CCCH	RACH				X		
	DCCH	RACH	X	X	X	X		
	DCCH	CPCH	X	X	X	X		
	DCCH	DCH	X	X			X	
	DTCH	RACH	X	X	X	X		
	DTCH	CPCH	X	X	X	X		
	DTCH	DCH	X	X			X	
	SHCCH	RACH				X		
	SHCCH	USCH	X	X		X		
	DCCH	USCH	X	X		X		
	DTCH	USCH	X	X		X		
Downlink (Rx)	BCCH	BCH						
	BCCH	FACH				X		
	PCCH	PCH						
	CCCH	FACH				X		
	CTCH	FACH				X		
	DCCH	FACH			X	X		
	DCCH	DSCH				X		
	DCCH	DCH					X	
	DCCH	HS-DSCH			X	X		X
	DTCH	FACH			X	X		
	DTCH	DSCH				X		
	DTCH	DCH					X	
	DTCH	HS-DSCH			X	X		X
	SHCCH	FACH				X		
	SHCCH	DSCH				X		

7 Services expected from physical layer

The physical layer offers information transfer services to MAC. For detailed description, see [3].

8 Elements for layer-to-layer communication

The interaction between the MAC layer and other layers are described in terms of primitives where the primitives represent the logical exchange of information and control between the MAC layer and other layers. The primitives shall not specify or constrain implementations. The MAC is connected to layer 1, RLC and RRC. The following subclauses describe the primitives between these layers.

8.1 Primitives between layers 1 and 2

The primitives are described in [3].

8.2 Primitives between MAC and RLC

8.2.1 Primitives

The primitives between MAC layer and RLC layer are shown in table 8.2.1.1.

Table 8.2.1.1: Primitives between MAC layer and RLC layer

Generic Name	Parameter			
	Request	Indication	Response	Confirm
MAC-DATA	Data, BO, UE-ID type indicator, RLC Entity Info	Data, No_TB, TD (note), Error indication		
MAC-STATUS		No_PDU, PDU_Size, TX status	BO, RLC Entity Info	
NOTE: TDD only.				

MAC-DATA-Req/Ind:

- MAC-DATA-Req primitive is used to request that an upper layer PDU be sent using the procedures for the information transfer service;
- MAC-DATA-Ind primitive indicates the arrival of upper layer PDUs received within one transmission time interval by means of the information transfer service.

MAC-STATUS-Ind/Resp:

- MAC-STATUS-Ind primitive indicates to RLC for each logical channel the rate at which it may transfer data to MAC. Parameters are the number of PDUs that can be transferred in each transmission time interval and the PDU size; it is possible that MAC would use this primitive to indicate that it expects the current buffer occupancy of the addressed logical channel in order to provide for optimised TFC selection on transport channels with long transmission time interval. At the UE, MAC-STATUS-Ind primitive is also used to indicate from MAC to RLC that MAC has requested data transmission by PHY (i.e. PHY-DATA-REQ has been submitted, see Fig. 11.2.2.1), or that transmission of an RLC PDU on RACH or CPCH has failed due to exceeded preamble ramping cycle counter.
- MAC-STATUS-Resp primitive enables RLC to acknowledge a MAC-STATUS-Ind. It is possible that RLC would use this primitive to indicate that it has nothing to send or that it is in a suspended state or to indicate the current buffer occupancy to MAC.

8.2.2 Parameters

a) Data:

- it contains the RLC layer messages (RLC-PDU) to be transmitted, or the RLC layer messages that have been received by the MAC sub-layer.

b) Number of transmitted transport blocks (No_TB) :

- indicates the number of transport blocks transmitted by the peer entity within the transmission time interval, based on the TFI value.

c) Buffer Occupancy (BO):

- the parameter Buffer Occupancy (BO) indicates for each logical channel the amount of data in number of bytes that is available for transmission and retransmission in RLC layer. When MAC is connected to an AM RLC entity, control PDUs to be transmitted and RLC PDUs outside the RLC Tx window shall also be included in the BO. RLC PDUs that have been transmitted but not negatively acknowledged by the peer entity shall not be included in the BO.

d) RX Timing Deviation (TD), TDD only:

- it contains the RX Timing Deviation as measured by the physical layer for the physical resources carrying the data of the Message Unit. This parameter is optional and only for Indication. It is needed for the transfer of the RX Timing Deviation measurement of RACH transmissions carrying CCCH data to RRC.

e) Number of PDU (No_PDU):

- specifies the number of PDUs that the RLC is permitted to transfer to MAC within a transmission time interval.

f) PDU Size (PDU_Size):

- specifies the size of PDU that can be transferred to MAC within a transmission time interval.

g) UE-ID Type Indicator:

- indicates the UE-ID type to be included in MAC for a DCCH when it is mapped onto a common transport channel (i.e. FACH, RACH, DSCH in FDD or CPCH). On the UE side UE-ID Type Indicator shall always be set to C-RNTI.

h) TX status:

- when set to value "transmission unsuccessful" this parameter indicates to RLC that transmission of an RLC PDU failed in the previous Transmission Time Interval, when set to value "transmission successful" this parameter indicates to RLC that the requested RLC PDU(s) has been submitted for transmission by the physical layer.

i) RLC Entity Info

- indicates to MAC the configuration parameters that are critical to TFC selection depending on its mode and the amount of data that could be transmitted at the next TTI. This primitive is meant to insure that MAC can perform TFC selection (see subclause 11.4).

j) Error indication

- When a MAC SDU is delivered to upper layer, an error indication is given for the SDU to upper layer if an error indication for the SDU has been received from lower layer.

8.3 Primitives between MAC and RRC

8.3.1 Primitives

The primitives between MAC and RRC are shown in table 8.3.1.1.

Table 8.3.1.1: Primitives between MAC sub-layer and RRC

Generic Name	Parameter			
	Request	**Indication**	**Response**	**Confirm**
CMAC-CONFIG	UE information elements, RB information elements, TrCH information elements, RACH transmission control elements, Ciphering elements, CPCH transmission control elements			
CMAC-MEASUREMENT	Measurement information elements	Measurement result		
CMAC-STATUS		Status info		

CMAC-CONFIG-Req:

- CMAC-CONFIG-Req is used to request for setup, release and configuration of a logical channel, e.g. RNTI allocation, switching the connection between logical channels and transport channels, TFCS update or scheduling priority of logical channel.

CMAC-MEASUREMENT-Req/Ind:

- CMAC-MEASUREMENT-Req is used by RRC to request MAC to perform measurements, e.g. traffic volume measurements;
- CMAC-MEASUREMENT-Ind is used to notify RRC of the measurement result.

CMAC-STATUS-Ind:

- CMAC-STATUS-Ind primitive notifies RRC of status information.

8.3.2 Parameters

See [7] for a detailed description of the UE, RB and TrCH information elements.

a) UE information elements
S-RNTI
SRNC identity
C-RNTI
Activation time

b) RB information elements
RB multiplexing info (Transport channel identity, Logical channel identity, MAC logical channel priority)

c) TrCH information elements
Transport Format Combination Set

d) Measurement information elements
Mode (Periodical, Event Trigger)
Reporting Quantity identifiers
Time interval to take an average or a variance (applicable when Average or Variance is Reporting Quantity)
Reporting Interval (applicable when mode is Periodical)
Upper and Lower Thresholds, THU and THL (applicable when mode is Event Trigger)

e) Measurement result
Mode
Reporting Quantity
Event ID, 4a or 4b (applicable when mode is Event Trigger)

f) Status info
when set to value ""transmission unsuccessful"" this parameter indicates to RRC that transmission of a TM RLC PDU failed (due to e.g. Maximum number of preamble ramping cycles reached for RACH in FDD), when set to value "transmission successful" this parameter indicates to RRC that the requested TM RLC PDU(s) has been submitted for transmission by the physical layer.

g) RACH transmission control elements
Set of ASC parameters (identifier for PRACH partitions, persistence values)
Maximum number of preamble ramping cycles (FDD) or synchronisation attempts (1.28Mcps TDD) M_{max}
Minimum and maximum number of time units between two preamble ramping cycles, N_{BO1min} and N_{BO1max} (FDD only)
ASC for RRC CONNECTION REQUEST message

h) Ciphering elements
Ciphering mode
Ciphering key
Ciphering sequence number

i) CPCH transmission control elements
CPCH persistency value, P for each Transport Format
Maximum number of preamble ramping cycles $N_{\_access\_fails}$
NF_max (Maximum number of frames for CPCH transmission for each Transport Format)
N_EOT (Number of EOT for release of CPCH transmission)
Backoff control timer parameters
Transport Format Set

Initial Priority Delays
Channel Assignment Active indication

9 Elements for peer-to-peer communication

9.1 Protocol data units

9.1.1 General

A MAC PDU is a bit string, with a length not necessarily a multiple of 8 bits. In the drawings in clause 9.1, bit strings are represented by tables in which the first bit is the leftmost one on the first line of the table, the last bit is the rightmost on the last line of the table, and more generally the bit string is to be read from left to right and then in the reading order of the lines.

Depending on the provided service, MAC SDUs are bit strings with any non-null length, or bit strings with an integer number of octets in length. An SDU is included into a MAC PDU from first bit onward.

In the UE for the uplink, all MAC PDUs delivered to the physical layer within one TTI are defined as Transport Block Set (TBS). It consists of one or several Transport Blocks, each containing one MAC PDU. The Transport Blocks, shall be transmitted in the order as delivered from RLC. When multiplexing of RLC PDUs from different logical channels is performed on MAC, the order of all Transport Blocks originating from the same logical channel shall be the same as the order of the sequence delivered from RLC. The order of the different logical channels in a TBS is set by the MAC protocol.

9.1.2 MAC ~~Data PDU~~PDU (non HS-DSCH)

A MAC PDU consists of an optional MAC header and a MAC Service Data Unit (MAC SDU), see figure 9.1.2.1. Both the MAC header and the MAC SDU are of variable size.

The content and the size of the MAC header depends on the type of the logical channel, and in some cases none of the parameters in the MAC header are needed.

The size of the MAC-SDU depends on the size of the RLC-PDU, which is defined during the setup procedure.

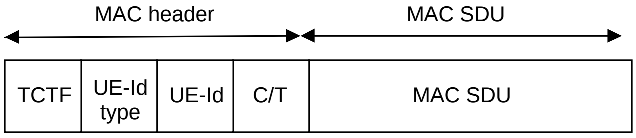


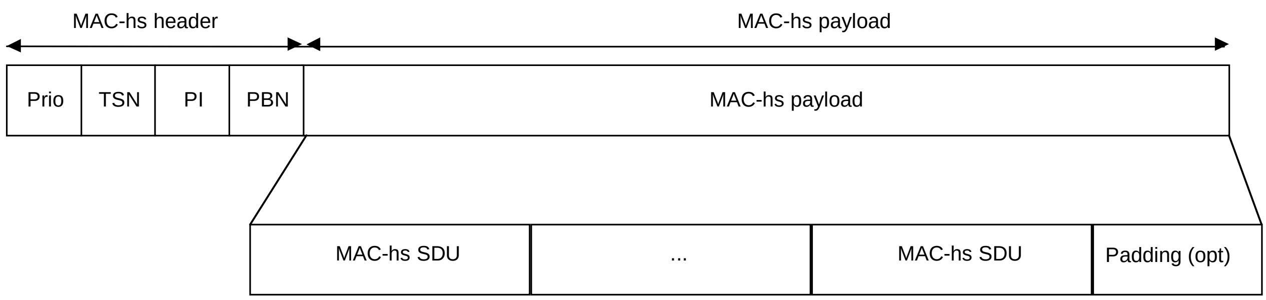
Figure 9.1.2.1: MAC ~~data~~ PDU

9.1.3 MAC-d PDU (HS-DSCH)

For HS-DSCH the MAC-d PDU format equals the MAC PDU format for the non HS-DSCH case. ~~described in 9.1.2~~

9.1.4 MAC PDU (HS-DSCH)

In case of HS-DSCH a MAC PDU consists of one MAC-hs header and one or more MAC-hs SDUs where each MAC-hs SDU equals a MAC-d PDU. A maximum of one MAC-hs PDU can be transmitted in a TTI per UE. The MAC-hs header is of variable size. The MAC-hs SDUs in one TTI belongs to the same reordering queue.



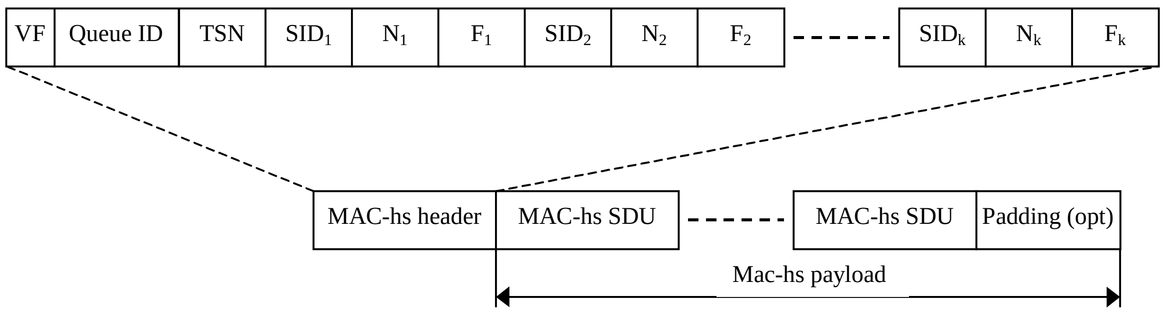


Figure 9.1.2.X: MAC-hs PDU

9.2 Formats and parameters

NOTE: MAC header field encodings as specified in this clause with designation "Reserved" are forbidden to be used by a sender in this version of the protocol.

9.2.1 MAC~~Data~~ PDU: Parameters of the MAC ~~header~~PDU header (non HS-DSCH) and MAC-d PDU header (HS-DSCH)

The following fields are defined for the MAC header for transport channels other than HS-DSCH and for the MAC-d PDU header for HS-DSCH:

- Target Channel Type Field
  The TCTF field is a flag that provides identification of the logical channel class on FACH and RACH transport channels, i.e. whether it carries BCCH, CCCH, CTCH, SHCCH or dedicated logical channel information. The size and coding of TCTF for FDD and TDD are shown in tables 9.2.1.1, 9.2.1.2, 9.2.1.3, 9.2.1.4 and 9.2.1.5. Note that the size of the TCTF field of FACH for FDD is either 2 or 8 bits depending of the value of the 2 most significant bits and for TDD is either 3 or 5 bits depending on the value of the 3 most significant bits. The TCTF of the RACH for TDD is either 2 or 4 bits depending on the value of the 2 most significant bits.

Table 9.2.1.1: Coding of the Target Channel Type Field on FACH for TDD

TCTF	Designation
000	BCCH
001	CCCH
010	CTCH
01100	DCCH or DTCH over FACH
01101-01111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
100	SHCCH
101-111	Reserved (PDUs with this coding will be discarded by this version of the protocol)

Table 9.2.1.2: Coding of the Target Channel Type Field on FACH for FDD

TCTF	Designation
00	BCCH
01000000	CCCH
01000001-01111111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
10000000	CTCH
10000001-10111111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
11	DCCH or DTCH over FACH

Table 9.2.1.3: Coding of the Target Channel Type Field on USCH or DSCH (TDD only)

TCTF	Designation
0	SHCCH
1	DCCH or DTCH over USCH or DSCH

Table 9.2.1.4: Coding of the Target Channel Type Field on RACH for FDD

TCTF	Designation
00	CCCH
01	DCCH or DTCH over RACH
10-11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

Table 9.2.1.5: Coding of the Target Channel Type Field on RACH for TDD

TCTF	Designation
00	CCCH
0100	DCCH or DTCH Over RACH
0101-0111	Reserved (PDUs with this coding will be discarded by this version of the protocol)
10	SHCCH
11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

- C/T field
  The C/T field provides identification of the logical channel instance when multiple logical channels are carried on the same transport channel. The C/T field is used also to provide identification of the logical channel type on dedicated transport channels and on FACH and RACH when used for user data transmission. The size of the C/T field is fixed to 4 bits for both common transport channels and dedicated transport channels. Table 9.2.1.5a shows the 4-bit C/T field.

Table 9.2.1.5a: Structure of the C/T field

C/T field	Designation
0000	Logical channel 1
0001	Logical channel 2
...	...
1110	Logical channel 15
1111	Reserved (PDUs with this coding will be discarded by this version of the protocol)

- UE-Id
  The UE-Id field provides an identifier of the UE on common transport channels. The following types of UE-Id used on MAC are defined:

  - UTRAN Radio Network Temporary Identity (U-RNTI) may be used in the MAC header of DCCH when mapped onto common transport channels in downlink direction; the U-RNTI is never used in uplink direction;

  - Cell Radio Network Temporary Identity (C-RNTI) is used on DTCH and DCCH in uplink, and may be used on DCCH in downlink and is used on DTCH in downlink when mapped onto common transport channels;

  - the UE id to be used by MAC is configured through the MAC control SAP. The lengths of the UE-id field of the MAC header are given in table 9.2.1.6.

Table 9.2.1.6: Lengths of UE Id field

UE Id type	Length of UE Id field
U-RNTI	32 bits
C-RNTI	16 bits

- UE-Id Type
  The UE-Id Type field is needed to ensure correct decoding of the UE-Id field in MAC Headers.

Table 9.2.1.7: UE-Id Type field definition

UE-Id Type field 2 bits	UE-Id Type
00	U-RNTI
01	C-RNTI
10	Reserved (PDUs with this coding will be discarded by this version of the protocol)
11	Reserved (PDUs with this coding will be discarded by this version of the protocol)

9.2.1.1 MAC header for DTCH and DCCH (not mapped on HS-DSCH)

a) DTCH or DCCH mapped to DCH, no multiplexing of dedicated channels on MAC:

- no MAC header is required.

b) DTCH or DCCH mapped to DCH, with multiplexing of dedicated channels on MAC:

- C/T field is included in MAC header.

c) DTCH or DCCH mapped to RACH/FACH:

- TCTF field, C/T field, UE-Id type field and UE-Id are included in the MAC header.

d) DTCH or DCCH mapped to DSCH or USCH:

- the TCTF field is included in the MAC header for TDD only. The UE-Id type and UE-Id are included in the MAC header for FDD only. The C/T field is included if multiplexing on MAC is applied.

e) DTCH or DCCH mapped to DSCH or USCH where DTCH or DCCH are the only logical channels:

- the UE-Id type and UE-Id are included in the MAC header for FDD only. The C/T field is included in the MAC header if multiplexing on MAC is applied.

f) DTCH or DCCH mapped to CPCH:

- UE-Id type field and UE-Id are included in the MAC header. The C/T field is included in the MAC header if multiplexing on MAC is applied.

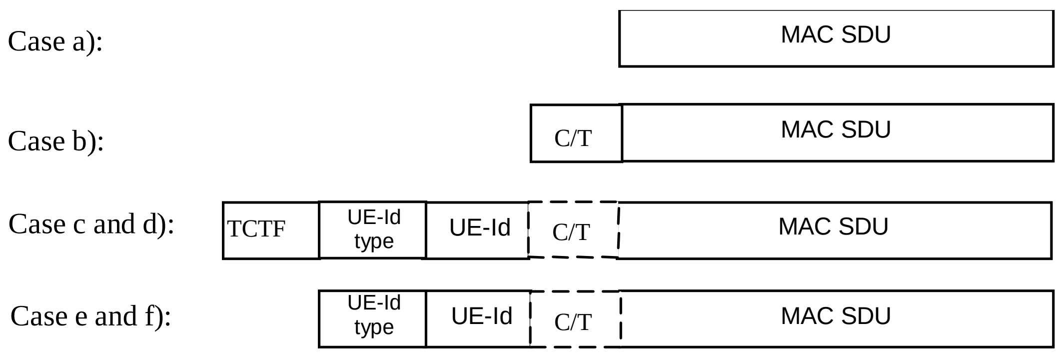


Figure 9.2.1.1.1: MAC~~Data~~ PDU formats for DTCH and DCCH

9.2.1.1a~~b~~ MAC-d Header for DTCH and DCCH (mapped on HS-DSCH)

The MAC-d PDU header for DTCH and DCCH mapped on HS-DSCH is as shown in figure X.

- C/T field is included in the MAC-d PDU header if multiplexing on MAC is applied

C/T	MAC SDU

Figure X: MAC-d PDU format for DTCH and DCCH mapped on HS-DSCH

9.2.1.2 MAC header for BCCH

a) BCCH mapped to BCH:

- no MAC header is included.

b) BCCH mapped to FACH:

- the TCTF field is included in MAC header.

Case a):

MAC SDU

Case b):

TCTF	MAC SDU

Figure 9.2.1.2.1: MAC~~Data~~ PDU formats for BCCH

9.2.1.3 MAC header for PCCH

There is no MAC header for PCCH.

9.2.1.4 MAC header for CCCH

CCCH mapped to RACH/FACH:

- TCTF field is included in MAC header.

TCTF	MAC SDU

Figure 9.2.1.4.1: MAC~~Data~~ PDU formats for CCCH

9.2.1.5 MAC Header for CTCH

The TCTF field is included as MAC header for CTCH as shown in figure 9.2.1.5.1.

TCTF	MAC SDU

Figure 9.2.1.5.1: MAC~~Data~~ PDU format for CTCH

9.2.1.6 MAC Header for SHCCH

The MAC header for SHCCH is as shown in figure 9.2.1.6.1.

a) SHCCH mapped to RACH and USCH/FACH and DSCH:

- TCTF has to be included.

b) SHCCH mapped to RACH and USCH/FACH and DSCH, where SHCCH is the only channel.

Case a):	TCTF	MAC SDU
Case b):		MAC SDU

Figure 9.2.1.6.1: MAC~~Data~~ PDU format for SHCCH

~~a~~9.2.2 MAC PDU: Parameters of the MAC header (HS-DSCH)

- Version Flag (VF)
  The VF field is a one bit flag providing extension capabilites of the MAC-hs PDU format. The VF field shall be set to zero and the value one is reserved in this version of the protocol.

- Queue identifier (Queue ID)
  The Queue ID field provides identification of the reordering queue in the receiver, in order to support independent buffer handling of data belonging to different reordering queues. The length of the Queue ID field is 3 bit.

- Transmission Sequence Number (TSN)
  The TSN field provides an identifier for the transmission sequence number on the HS-DSCH. The TSN field is used for reordering purposes to support in-sequence delivery to higher layers. The length of the TSN field is 6 bit.

- Size index identifier (SID)
  The SID fields identifies the size of a set of consecutive MAC-d PDUs. The MAC-d PDU size for a given SID is configured by higher layers and is independent for each Queue ID. The length of the SID field is 3 bit.

- Number of MAC-D PDUs (N)
  The number of consecutive MAC-d PDUs with equal size is identified with the N field. The length of the N field is 7 bit.

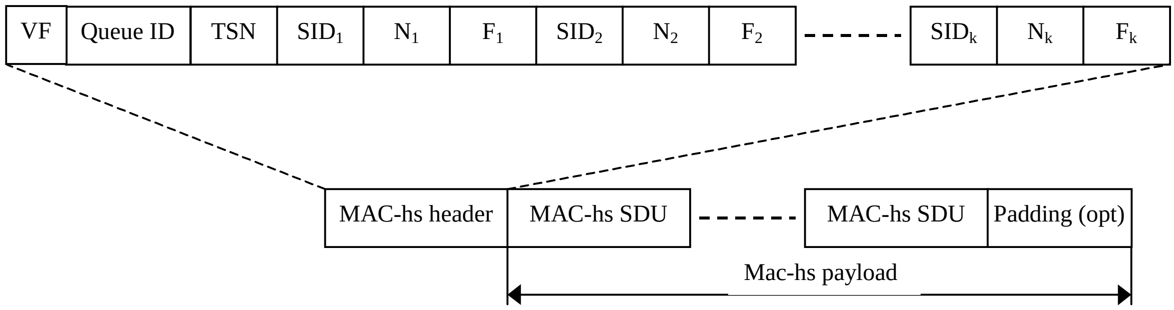
- Flag (F)
  The F field is a flag indicating if more SID fields are present in the MAC-hs header or not. If the F field is set to "0" the F field is followed by a SID field. If the F field is set to "0" the F field is followed by a MAC-d PDU.

9.2.2~~1~~.1 MAC header for DTCH and DCCH

a) DTCH or DCCH mapped to HS-DSCH:

- The Queue ID field and TSN field are always included in the MAC-hs header. One SID field, N field and F field is included for each MAC-d PDU size included in the MAC-hs PDU. Padding is not explicitly indicated but is included in the end of the MAC-hs PDU if the total size of the MAC-hs payload is smaller than the transport block set size~~. The C/T field is included in the MAC header if multiplexing on MAC is applied~~.

Case a):



10 Handling of unknown, unforeseen and erroneous protocol data

The list of error cases is reported below:

a) Use of reserved coding in the MAC header

If the MAC entity receives a ~~Data~~MAC PDU with a header field using a value marked as reserved for this version of the protocol, it shall discard the PDU, unless explicitly mentioned otherwise.

b) Inconsistent MAC header

If the MAC entity receives a ~~data~~MAC PDU with a header inconsistent with the configuration received from RRC, it shall discard the PDU. E.g.: In case DTCH is mapped to RACH/FACH, the MAC entity shall discard a PDU with a C/T field indicating a logical channel number that is not configured.

c) Erroneous MAC header fields

The MAC PDU shall be discarded if the lower layer gives an error indication for a MAC PDU and a MAC header is included in the MAC PDU.

11 Specific functions

11.5 Control of HS-DSCH transmission and reception

11.5.1 Network operation

The following are the functions of the various functional entities at the network in support of the HARQ protocol used on HS-DSCH.

11.5.1.1 Scheduler

The scheduler performs the following functions:

- Schedules all UEs within a cell
- Services priority queues
  - The scheduler schedules MAC-hs SDUs based on information from the Iub frame protocol. One UE may be associated with one or more MAC-d flows. Each MAC-d flow contains HS-DSCH MAC-d PDUs for one or more priority queues.
- Determines the HARQ Entity and the queue to be serviced

- Indicates the Queue ID and TSN to the HARQ entity for each MAC-hs PDU to be transmitted
- Scheduling of new transmissions and retransmissions
  - Based on the status reports from HARQ Processes the scheduler determines if either a new transmission or a retransmission should be made. A new transmission can however be initiated on a HARQ process at any time.
- Determines the redundancy version
  - The scheduler determines a suitable redundancy version for each transmitted and retransmitted MAC-hs PDU and indicates the redundancy version to lower layer.

11.5.1.2 HARQ entity

- There is one HARQ entity per UE in UTRAN.
- The HARQ entity sets the Queue ID in transmitted MAC-hs PDUs. UTRAN should:
  - set the Queue ID based on the identity of the queue being serviced.
- The HARQ entity sets the transmission sequence number (TSN) in transmitted MAC-hs PDUs. UTRAN should
  - set the TSN to value 0 for the first MAC-hs PDU transmitted for one HS-DSCH and Queue ID;
  - increment the TSN with one for each transmitted MAC-hs PDU on a HS-DSCH and Queue ID
- The HARQ entity sets the HARQ process identifier in transmitted MAC-hs PDUs. UTRAN should
  - determine a suitable HARQ process to service the MAC-hs PDU and set the HARQ process identifier accordingly.

11.5.1.3 HARQ process

- The HARQ process sets the New data indicator in transmitted MAC-hs PDUs. UTRAN should:
  - set the New Data Indicator to the value "0" for the first MAC-hs PDU transmitted by a HARQ process;
  - not increment the New Data Indicator for subsequent transmissions of a MAC-hs PDU;
  - increment the New Data Indicator with one for each transmitted MAC-hs PDU containing new data;
- The HARQ process processes received status messages. UTRAN should:
  - deliver received status messages to the scheduler.

11.5.2 UE operation

The UE operation in support of the HARQ protocol used on HS-DSCH is split among the following four functional units with their associated functions.

11.5.2.1 HARQ Entity

- There is one HARQ entity at the UE which processes the HARQ process identifiers in received MAC-hs PDUs on HS-DSCH.
- Each received MAC-hs PDU shall be allocated to the HARQ process indicated by the HARQ process identifier of the MAC-hs PDU.

11.5.2.2 HARQ process

A number of parallel HARQ processes is used in the UE to support the HARQ protocol. The number of HARQ processes is configured by upper layers.

The HARQ process processes the New Data Indicator indicated by lower layers for each~~in~~ received MAC-hs PDU~~s~~.

- If the New Data Indicator has been incremented compared to the value in the previous received transmission in this HARQ process ~~of the MAC-hs PDU~~ or this is the first received transmission in the HARQ process ~~of the MAC-hs PDU~~ the UE shall:
- replace the data currently in the soft buffer for this HARQ process with the received data;~~MAC-hs PDU~~

  Note: alternative solutions for the use of the New Data Indicator are FFS

- If the New Data Indicator is identical to the value used in the previous received transmission in the HARQ process ~~of the MAC-hs PDU~~ the UE shall:
  - combine the received ~~MAC-hs PDU~~data with the data currently in the soft buffer for this HARQ process.
- if the data in the soft buffer has been successfully decoded and no error was detected the UE shall:
  - deliver the decoded ~~data~~MAC-hs PDU to the reordering entity;
  - generate a positive acknowledgement (ACK) of the ~~MAC-hs PDU~~data in this HARQ process;
- else:
  - generate a negative acknowledgement (NAK) of the ~~MAC-hs PDU~~data in this HARQ process;
- the generated positive or negative acknowledgement shall be scheduled for transmission and the time of transmission relative to the reception ~~of the MAC-hs PDU~~of data in a HARQ process is configured by upper layer;

The HARQ process processes the Queue ID in the received MAC-hs PDUs. The UE shall:

- arrange the received MAC-hs PDUs in queues based on the Queue ID;

11.5.2.3 Reordering entity

11.5.2.3.1 Definitions

In the functions described in this section the following definitions apply:

- Next_expected_TSN:
  The next_expected_TSN is the Transmission sequence number (TSN) following the TSN of the last in-sequence MAC-hs PDU received. It shall be updated upon the receipt of the MAC-hs PDU with TSN equal to Next_expected_TSN. The initial value of Next_expected_TSN =0.
- Transmitter window
  The transmitter window defines which MAC-hs PDUs that the transmitter can retransmit without causing an ambiguity of the TSN in the receiver. The size of the transmitter window equals WINDOW and the maximum value of WINDOW is 32. The initial transmitter window equals [0..31]. The configuration of WINDOW by higher layers is FFS.
- Receiver window
  The receiver window defines which MAC-hs PDUs that can be received in the receiver without causing an advancement of the receiver window according to the procedure below. The size of the receiver window equals WINDOW and the maximum value of WINDOW is 32. The initial receiver window equals [0..31]. The configuration of WINDOW by higher layers is FFS.

The timer T1 controls the stall avoidance in the UE reordering buffer. The value of T1 is configured by upper layers.

If no timer T1 is active:

- the timer T1 shall be started when a MAC-hs PDU with TSN=SN is correctly received but can not be delivered to the disassembly function due to that ~~a~~the MAC-hs PDU with ~~lower~~ TSN equal to Next_expected_TSN is missing.

If a timer T1 is already active

- no additional timer shall be started, i.e. only one timer T1 may be active at a given time.

The timer T1 shall be stopped if

- the MAC-hs PDU for which the timer was started can be delivered to the disassembly function before the timer expires.

When the timer T1expires,

- all correctly received MAC-hs PDUs up to and including SN-1 shall be delivered to the disassembly function and be removed from the reordering buffer
- all correctly received MAC-hs PDUs up to the first missing MAC-hs PDU shall be delivered to the disassembly function.

When the timer T1 is stopped or expires, and there still exist some received MAC-hs PDUs that can not be delivered to higher layer,

- timer T1 is started for the MAC-hs PDU with highest TSN among those MAC-hs PDUs that can not be delivered.

Transmitter operation;

After the transmitter has transmitted a MAC-hs PDU with TSN=SN, any MAC-hs PDU with TSN ≤ SN – WINDOW should not be retransmitted to avoid sequence number ambiguity in the receiver. A MAC-hs PDU that has been aborted by the transmitter after being transmitted one or more times, should not be retransmitted after it has been aborted.

Receiver operation;

- If the soft buffers in all the HARQ processes are empty (i.e. no data in the buffers exists that will be soft combined with later received data):
  - all correctly received MAC-hs PDUs shall be delivered to the disassembly function and be removed from the reordering buffer and;
  - consider these MAC-hs PDUs as being received in the following procedure;
- MAC-hs PDUs that have been discarded by the timer based mechanism shall be considered as being received in the following procedure.

When a MAC-hs PDU with TSN = SN is received;

- If SN is within the receiver window and this MAC-hs PDU has not previously been received, the MAC-hs PDU is placed in the reordering buffer at the place indicated by the TSN.
- If SN is within the receiver window, and this MAC-hs PDU has been previously received the MAC-hs PDU shall be discarded.
- If SN is outside the receiver window:
  - the received MAC-hs PDU shall be placed above the highest received TSN in the reordering buffer, at the position indicated by SN.
  - the receiver window shall be advanced so that SN forms the upper edge of the receiver window
  - any MAC-hs PDUs with TSN ≤ SN – WINDOW shall be removed from the reordering buffer and be delivered to the disassembly entity.
- All received MAC-hs PDUs with consecutive TSNs from next_expected_TSN up to the first not received MAC-hs PDU are delivered to the disassembly entity. The TSN of this first not received MAC-hs PDU becomes the next_expected_TSN

11.5.2.4 Disassembly entity

For each MAC-hs PDU that is delivered to the disassembly function, the UE shall:

- remove any padding bits if present;
- remove the MAC-hs header;
- deliver the MAC-d PDUs in the MAC-hs PDU to ~~higher layer~~MAC-d.

Tdoc R2-020558

CR-Form-v5

CHANGE REQUEST

⌘ **25.306 CR 029** ⌘ **rev r2** ⌘ Current version: **4.3.0** ⌘

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: ⌘	HSDPA UE capabilities
Source: ⌘	TSG-RAN WG2
Work item code: ⌘	HSDPA-L23 — ***Date:*** ⌘ 21 February 2002
Category: ⌘	**B** — ***Release:*** ⌘ REL-5

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: ⌘	Introduction of HSDPA UE capabilities.
Summary of change: ⌘	HS-DSCH transport channel and physical channel parameters are based on TR 25.858v0.2.0. HS-DSCH L2 parameters are based on tdocs 12A010051 and R2-012611. Further updates based on RAN2#26. RAN2#27: - PHY parameters based on RAN WG1 decisions in R2-020427 - 1.28 Mcps TDD parameters based on R1-02-0452
Consequences if not approved: ⌘	

Clauses affected: ⌘	4.3, 4.5.1, 4.5.3, 4.5.5.2, 5.1, 5.2.2
Other specs affected: ⌘	[X] Other core specifications ⌘ 25.331 [ ] 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.

4 UE radio access capability parameters

In the following the UE radio capability parameters are defined. When using the RRC configuration parameters, UTRAN needs to respect the UE capabilities. Only parameters for which there is a need to set different values for different UEs are considered as UE capability parameters. Therefore, the capabilities that are the same for all UEs, including baseline capabilities, are not listed here.

UTRAN need to respect the UE capabilities when configuring the RBs. Actions in the UE when capabilities are in conflict with a UTRAN request are specified in RRC.

4.1 PDCP parameters

Support for RFC 2507

This parameter defines whether the UE supports header compression according to RFC 2507 as defined in [1] or not.

Support for RFC 3095

This parameter defines whether the UE supports header compression according to RFC 3095 as defined in [1] or not.

Support for loss-less SRNS relocation

Defines whether the UE supports loss-less SRNS relocation as defined in [1] or not.

Maximum header compression context space

This parameter is only applicable if the UE supports header compression according to RFC 2507. It is defined as the maximum header compression context size supported by the UE.

4.2 Void

4.3 RLC and MAC-hs parameters

Total RLC AM and MAC-hs buffer size

When HS-DSCH is not configured this~~This~~ is defined as the maximum total buffer size across all RLC AM entities supported by the UE. When HS-DSCH is configured this is defined as the maximum total buffer size across all MAC-hs reordering entities and all RLC AM entities supported by the UE. UTRAN controls that the UE capability can be fulfilled through the following parameters:

1. The number of RLC AM entities configured (no explicit RRC parameter);
2. UL PDU size;
3. DL PDU size;
4. Transmission window size (in number of PDUs);
5. ~~5.~~ Receiving window size (in number of PDUs);
6. MAC-hs reordering buffer size.

The following criterion must be fulfilled in the configuration at all times:

$$\sum_{i=1}^{\#RLC\_AM\_entities} Transmission\_window\_size \bullet (UL\_AMD\_PDU\_size - AMD\_Header\_size) + \sum_{i=1}^{\#RLC\_AM\_entities} Receiving\_window\_size \bullet (DL\_AMD\_PDU\_size - AMD\_Header\_size) \leq Total\_RLC\_buffer\_size$$

$$\sum_{i=1}^{\#RLC\_AM\_entities} Transmission\_window\_size_i \bullet (UL\_AMD\_PDU\_size_i - AMD\_Heade$$

$$\sum_{i=1}^{\#RLC\_AM\_entities} Receiving\_window\_size_i \bullet (DL\_AMD\_PDU\_size_i - AMD\_Head$$

$$\sum_{j=1}^{\#MAC-hs\_reordering\_entities} MAC-hs\_reordering\_entity\_buffer\_size_j$$

$$\leq Total\_buffer\_size$$

~~w~~where i is the RLC "entity number".

Maximum number of AM entities

This is defined as the maximum number of RLC AM entities supported by the UE.

4.4 Void

4.5 PHY parameters

4.5.1 Transport channel parameters in downlink

Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant

NOTE: "Being received" refers to all bits in the active TFC within the TFCS over all simultaneous transport channels received by the UE. "Arbitrary time instant" means that the time instant corresponding to the highest sum of number of bits is relevant. This note also applies to similar parameter definitions below

This parameter is defined as:

$$\Sigma_i(N_i)$$

where N_i is defined as the number of bits in transport block #i, and the sum is over all transport blocks being received at an arbitrary time instant. All transport blocks that are to be simultaneously received by the UE on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

NOTE: A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* * *Transport Block size* over all simultaneous transport channels is larger than what the UE capability indicates.

This UE capability also limits the maximum number of bits before de-rate-matching as follows: The maximum number of bits before de-rate matching being received at an arbitrary time instant (DPCH, PDSCH, S-CCPCH) shall be less or equal to 6.6 times the Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant.

Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be convolutionally coded.

Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be turbo coded.

Maximum number of simultaneous transport channels

This is defined as the maximum number of downlink Transport Channels that the UE is capable to process simultaneously, not taking into account the rate of each Transport Channel.

NOTE: The number of simultaneous transport channels affects how the total memory space and processing capacity can be shared among the transport channels. A UE does not need to support more simultaneous transport channels than the UE capability allows for.

Maximum number of simultaneous CCTrCH

This is defined as the maximum number of downlink CCTrCH that the UE is capable to process simultaneously. CCTrCH should be interpreted as consisting of DCH, FACH or DSCH.

Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval

All transport blocks that are to be simultaneously received by the UE on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

NOTE: Relates to processing requirements for CRC in downlink. A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* is larger than what the UE capability indicates. In the case of several CCTrCHs, the combination of the TFCs within the respective TFCSs for simultaneous TTIs at an arbitrary time instant shall not exceed this parameter.

Maximum number of TFC in the TFCS

Defines the maximum number of transport format combinations in a downlink transport format combination set the UE can store.

Maximum number of TF

The maximum total number of downlink transport formats the UE can store, where all transport formats for all downlink transport channels are counted.

Support for turbo decoding

Defines whether turbo decoding is supported or not.

Maximum number of HS-DSCH transport channel bits received within a HS-DSCH TTI

Defines the maximum number of HS-DSCH transport channel bits the UE is capable of receiving within a HS-DSCH TTI.

4.5.2 Transport channel parameters in uplink

Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant

NOTE: "Being transmitted" refers to all bits in the active TFC within the TFCS over all simultaneous transport channels transmitted by the UE. "Arbitrary time instant" means that the time instant corresponding to the highest sum of number of bits is relevant. This note also applies to similar parameter definitions below.

This parameter is defined as:

$$\Sigma_i(N_i)$$

where N_i is defined as the number of bits in transport block #i, and the sum is over all transport blocks being transmitted at an arbitrary time instant.

NOTE: This parameter is related to memory requirements for uplink data received from MAC before it can be transmitted over the radio interface. As shown in Figure 4.1 the worst case occurs for the maximum TTI. A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* * *Transport Block size* over all simultaneous transport channels is larger than what the UE capability indicates.

Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be convolutionally coded.

Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be turbo coded.

Maximum number of simultaneous transport channels

This is defined as the maximum number of uplink transport channels that the UE is capable to process simultaneously, not taking into account the rate of each transport channel.

NOTE: A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks* * *Transport Block size* over all simultaneous transport channels is larger than what the UE capability indicates.

Maximum number of simultaneous CCTrCH

This parameter is applicable for TDD only. For FDD there is always only one CCTrCH at a time. The parameter is defined as the maximum number of uplink CCTrCH that the UE is capable to process simultaneously.

Maximum total number of transport blocks transmitted within TTIs that start at the same time

Defines the maximum number of transport blocks that the UE is capable to transmit within TTIs that start at the same time. An example is shown in Figure 4.1.

NOTE: Relates to processing requirements for CRC in uplink.

Maximum number of TFC in the TFCS

Defines the maximum number of transport format combinations in an uplink transport format combination set the UE can store.

Maximum number of TF

The maximum total number of uplink transport formats the UE can store, where all transport formats for all uplink transport channels are counted.

Support for turbo encoding

Defines whether turbo encoding is supported or not.

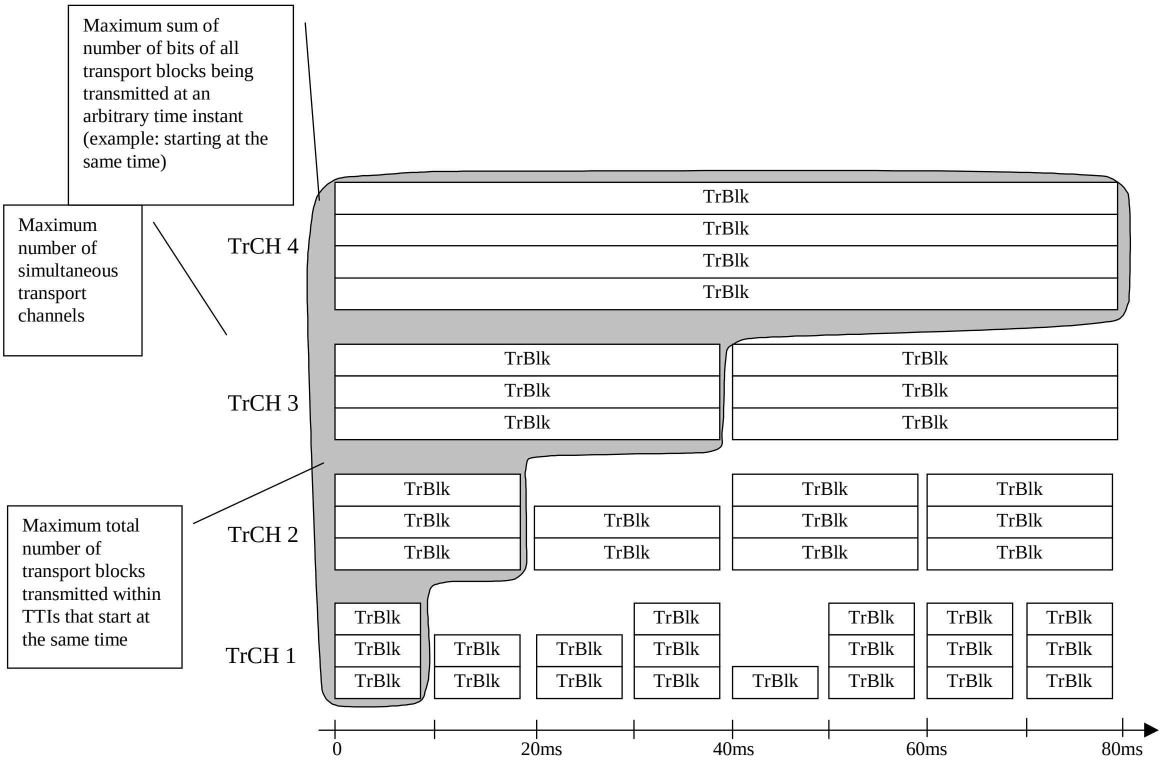


Figure 4.1: UE transport channel processing limitations in uplink

4.5.3 FDD Physical channel parameters in downlink

Maximum number of DPCH/PDSCH codes to be simultaneously received

Defines the number of codes the UE is capable of receiving in parallel. For DPCH in soft/softer handover, each DPCH is only calculated once in this capability. The capability does not include codes used for S-CCPCH.

Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)

Defines the number of physical channel bits the UE is capable of receiving. For DPCH in soft/softer handover, each DPCH is only calculated once in this capability.

The number of DPCH channel bits indicates the capability of the UE when operating in non-compressed mode.

The parameter also indicates the capability of the UE to support compressed mode by spreading factor reduction as follows. The UE shall:

- for parameter values up to and including 9600 bits:
  - support compressed mode by spreading factor reduction when operating at any value up to the reported capability;
- for parameter values greater than 9600 bits:
  - support compressed mode by spreading factor reduction when operating at any value up to the greater of:

- half the reported capability; or
- 9600bits.

NOTE: Compressed mode by spreading factor reduction is not applicable when operating at spreading factor 4.

Support for SF 512

Defines whether the UE supports spreading factor 512 in downlink or not.

Support of PDSCH

Defines whether the UE supports PDSCH or not.

Simultaneous reception of SCCPCH and DPCH

Defines whether the UE supports simultaneous reception of SCCPCH and DPCH or not.

NOTE: Simultaneous reception of SCCPCH and DPCH, i.e. simultaneous reception of FACH and DCH is required for e.g. DRAC procedure

Simultaneous reception of SCCPCH, DPCH and PDSCH

Defines whether the UE supports simultaneous reception of SCCPCH, DPCH and PDSCH or not. The PDSCH part of this capability is only relevant if the UE supports PDSCH, as covered by the capability "Support of PDSCH".

NOTE: Simultaneous reception of SCCPCH, DPCH and PDSCH, i.e. simultaneous reception of FACH, DCH and DSCH is required for e.g. simultaneous use of DSCH and the DRAC procedure.

Maximum number of simultaneous S-CCPCH radio links

Defines the maximum number of radio links on which the UE is capable of receiving S-CCPCH simultaneously.

Support of dedicated pilots for channel estimation

Defines whether the UE supports dedicated pilots for channel estimation or not.

Maximum number of HS-DSCH codes received

Defines the maximum number of HS-DSCH codes the UE is capable of receiving.

Total number of soft channel bits in HS-DSCH

Defines the maximum number of soft channel bits over all HARQ processes.

Minimum inter-TTI interval in HS-DSCH

Defines the distance from the beginning of a TTI to the beginning of the next TTI that can be assigned to the UE.

4.5.4 FDD physical channel parameters in uplink

Maximum number of DPDCH bits per 10 ms

Defines the maximum number of the DPDCH bits the UE is capable to transmit per 10 ms.

If the reported capability is lower than 9600, the number of DPDCH channel bits indicates the capability of the UE when operating in non-compressed mode; if the reported capability is equal to or greater than 9600 it indicates the maximum capability of the UE considering both compressed and non compressed mode operation.

NOTE: This capability combines the 'Max number of DPDCH' and 'Minimum SF' capabilities into one capability. Note that no flexibility is lost due to this, as multiple DPDCH is only used for SF=4, i.e. when the number of DPDCH bits exceed a certain value.

NOTE: Compressed mode by spreading factor reduction is not applicable when operating at spreading factor 4.

Support of PCPCH

Defines whether the UE supports PCPCH or not.

NOTE: When CPCH is supported, then simultaneous DPCCH & SCCPCH reception is needed.

4.5.5 TDD physical channel parameters in downlink

4.5.5.1 3.84 Mcps TDD physical channel parameters in downlink

Maximum number of timeslots per frame

Defines the maximum number of timeslots per frame that the UE can receive.

Maximum number of physical channels per frame

This parameter defines how many physical channels can be received during one frame. The distribution of the received physical channels on the received timeslots can be arbitrary.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PDSCH

Defines whether PDSCH is supported or not.

Maximum number of physical channels per timeslot

This parameter defines how many physical channels can be received within one timeslot.

4.5.5.2 1.28 Mcps TDD physical channel parameters in downlink

Maximum number of timeslots per subframe

Defines the maximum number of timeslots per subframe that the UE can receive.

Maximum number of physical channels per subframe

This parameter defines how many physical channels can be received during one subframe. The distribution of the received physical channels on the received timeslots can be arbitrary.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PDSCH

Defines whether PDSCH is supported or not.

Maximum number of physical channels per timeslot

This parameter defines how many physical channels can be received within one timeslot.

Support of 8PSK

Defines whether 8PSK modulation is supported or not.

Maximum number of HS-DSCH codes per timeslot

This is the maximum number of channelisation codes that can be used for the HS-DSCH in a given downlink timeslot. Where the parameter “Maximum number of physical channels per timeslot” is larger than “Maximum number of HS-DSCH codes per timeslot, this indicates that the UE is able to receive HS-SCCH or associated DPCH transmissions in the same timeslot as HS-PDSCHs, even if the maximum HS-DSCH code allocation for that slot is being used.

Maximum number of HS-DSCH timeslots per TTI

This is the maximum number of timeslots in a given 5 ms subframe that can be used for HS-DSCH transmissions.

Support of SF=1 for HS-PDSCH

4.5.6 TDD physical channel parameters in uplink

4.5.6.1 3.84 Mcps TDD physical channel parameters in uplink

Maximum Number of timeslots per frame

Defines the maximum number of timeslots per frame that the UE can transmit.

Maximum number of physical channels per timeslot

Defines the maximum number physical channels transmitted in parallel during one timeslot.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PUSCH

Defines whether PUSCH is supported or not.

4.5.6.2 1.28 Mcps TDD physical channel parameters in uplink

Maximum Number of timeslots per subframe

Defines the maximum number of timeslots per subframe that the UE can transmit.

Maximum number of physical channels per timeslot

Defines the maximum number of physical channels transmitted in parallel during one timeslot.

Minimum SF

Defines the minimum SF supported by the UE.

Support of PUSCH

Defines whether PUSCH is supported or not.

Support of 8PSK

Defines whether 8PSK modulation is supported or not.

4.5.7 RF parameters

UE power class

Indicates the UE power class as defined in [4] for FDD and [5] for TDD.

Radio frequency bands

This parameter is only applicable for TDD. It defines the uplink and downlink frequency bands supported by the UE as defined in [5].

Tx/Rx frequency separation

This parameter is only applicable for FDD and only if the UE is operating in frequency band a as defined in [4]. It defines the uplink/downlink frequency separations supported by the UE.

4.6 Multi-mode related parameters

Support of UTRA FDD

Defines whether UTRA FDD is supported.

There is no explicit configuration parameter.

Support of UTRA TDD 3.84 Mcps

Defines whether UTRA TDD 3.84 Mcps is supported.

There is no explicit configuration parameter.

Support of UTRA TDD 1.28 Mcps

Defines whether UTRA TDD 1.28 Mcps is supported.

There is no explicit configuration parameter.

4.7 Multi-RAT related parameters

Support of GSM

Defines whether GSM is supported or not. There is a separate parameter for each GSM frequency band.

Support of multi-carrier

Defines whether multi-carrier is supported or not.

4.8 UE positioning related parameters

Standalone location method(s) supported

Defines if a UE can measure its location by some means unrelated to UTRAN (e.g. if the UE has access to a standalone GPS receiver).

OTDOA UE based method supported

Defines if a UE supports the OTDOA UE based schemes.

Network Assisted GPS support

Defines if a UE supports either of the two types of assisted GPS schemes, namely "Network based", "UE based", "Both", or "none".

GPS reference time capable

Defines if a UE has the capability to measure GPS reference time as defined in [6].

Support for IPDL

Defines if a UE has the capability to use IPDL to enhance its "SFN-SFN observed time difference –type 2" measurement.

Support for Rx-Tx time difference type 2

Defines if a UE has the capability to perform the Rx-Tx time difference type 2 measurement.

4.9 Measurement related capabilities

Need for downlink compressed mode

Defines whether the UE needs compressed mode in the downlink in order to perform inter-frequency or inter-RAT measurements. There are separate parameters for measurements on each UTRA mode, on each RAT, and in each frequency band.

Need for uplink compressed mode

Defines whether the UE needs compressed mode in the uplink in order to perform inter-frequency or inter-RAT measurements. There are separate parameters for measurements on each UTRA mode, on each RAT, and in each frequency band.

4.10 General capabilities

ICS version

This is defined as the release version of the Implementation Conformance Statement (ICS) proforma specification [3] that is applicable for the UE.

5 Possible UE radio access capability parameter settings

5.1 Value ranges

Table 5.1: UE radio access capability parameter value ranges

		UE radio access capability parameter	Value range
PDCP parameters		Support for RFC 2507	Yes/No
		Support for RFC 3095	Yes/No
		Support for loss-less SRNS relocation	Yes/No
		Maximum header compression context space	512, 1024, 2048, 4096, 8192 bytes
RLC and MAC-hs parameters		Total RLC AM and MAC-hs buffer size	2,10,50,100,150,500,1000 kBytes
		Maximum number of AM entities	3,4,5,6,8,16,30
PHY parameters	Transport channel parameters in downlink	Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	4, 8, 16, 32
		Maximum number of simultaneous CCTrCH	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks received within TTIs that end within the same 10 ms interval	4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC in the TFCS	16, 32, 48, 64, 96, 128, 256, 512, 1024
		Maximum number of TF	32, 64, 128, 256, 512, 1024
		Support for turbo decoding	Yes/No
		~~Maximum number of HS-DSCH transport channel bits received within a HS-DSCH TTI~~	~~[1600], [4000], [6400], [9600], [14400], [19200], [27200]~~
	Transport channel parameters in uplink	Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	640, 1280, 2560, 3840, 5120, 6400, 7680, 8960, 10240, 20480, 40960, 81920, 163840
		Maximum number of simultaneous transport channels	2, 4, 8, 16, 32
		Maximum number of simultaneous CCTrCH of DCH type (TDD only)	1, 2, 3, 4, 5, 6, 7, 8
		Maximum total number of transport blocks transmitted within TTIs that start at the same time	2, 4, 8, 16, 32, 48, 64, 96, 128, 256, 512
		Maximum number of TFC in the TFCS	4, 8, 16, 32, 48, 64, 96, 128, 256, 512, 1024
		Maximum number of TF	32, 64, 128, 256, 512, 1024
		Support for turbo encoding	Yes/No

		UE radio access capability parameter	Value range
PDCP parameters		Support for RFC 2507	Yes/No
	FDD Physical channel parameters in downlink	Maximum number of DPCH/PDSCH codes to be simultaneously received	1, 2, 3, 4, 5, 6, 7, 8
		Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH)	600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 48000, 57600, 67200, 76800
		Support for SF 512	Yes/No
		Support of PDSCH	Yes/No
		Support of HS-PDSCH	Yes/No
		Simultaneous reception of SCCPCH and DPCH	Yes/No
		Simultaneous reception of SCCPCH, DPCH and PDSCH	Yes/No
		Maximum number of simultaneous S-CCPCH radio links	1 NOTE: Only the value 1 is part of this release of the specification
		Support of dedicated pilots for channel estimation	Yes/No
		~~Maximum number of HS-DSCH codes received~~	~~5, 10, 15~~
		~~Total number of soft channel bits in HS-DSCH~~	~~[19200], [38400], [48000], [57600], [76800], [96000], [115200], [153600], [172800]~~
		~~Minimum inter-TTI interval in HS-DSCH~~	~~1, 2, 3~~
	FDD Physical channel parameters in uplink	Maximum number of DPDCH bits transmitted per 10 ms	600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 48000, 57600
		Support of PCPCH	Yes/No
	TDD 3.84 Mcps physical channel parameters in downlink	Maximum number of timeslots per frame	1..14
		Maximum number of physical channels per frame	1,2,3..224
		Minimum SF	16, 1
		Support of PDSCH	Yes/No
		Maximum number of physical channels per timeslot	1..16
	TDD 3.84 Mcps physical channel parameters in uplink	Maximum Number of timeslots per frame	1..14
		Maximum number of physical channels per timeslot	1, 2
		Minimum SF	16,8,4,2,1
		Support of PUSCH	Yes/No
	TDD 1.28 Mcps physical channel parameters in downlink	Maximum number of timeslots per subframe	1..6
		Maximum number of physical channels per subframe	1,2,3,…,96
		Minimum SF	16, 1
		Support of PDSCH	Yes/No
		Maximum number of physical channels per timeslot	1..16
		Support 8PSK	Yes/No
	TDD 1.28 Mcps physical channel parameters in uplink	Maximum number of timeslots per subframe	1..6
		Maximum number of physical channels per timeslot	1,2
		Minimum SF	16,8,4,2,1
		Support of 8PSK	Yes/No
		Support of PUSCH	Yes/No
RF parameters	FDD RF parameters	UE power class	3, 4 NOTE: Only power classes 3 and 4 are part of this release of the specification

		UE radio access capability parameter	Value range
PDCP parameters		Support for RFC 2507	Yes/No
		Tx/Rx frequency separation	190 MHz 174.8-205.2 MHz 134.8-245.2 MHz
RF parameters	TDD 3.84 Mcps RF parameters	UE power class	2,3 NOTE: Only power classes 2 and 3 are part of this release of the specification
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
	TDD 1.28 Mcps RF parameters	UE power class	2,3
		Radio frequency bands	a), b), c), a+b), a+c), b+c), a+b+c)
Multi-mode related parameters		Support of UTRA FDD	Yes/No
		Support of UTRA TDD 3.84 Mcps	Yes/No
		Support of UTRA TDD 1.28 Mcps	Yes/No
Multi-RAT related parameters		Support of GSM	Yes/No (per GSM frequency band)
		Support of multi-carrier	Yes/No
UE positioning related parameters		Standalone location method(s) supported	Yes/No
		Network assisted GPS support	Network based / UE based / Both/ None
		GPS reference time capable	Yes/No
		Support for IPDL	Yes/No
		Support for OTDOA UE based method	Yes/No
		Support for Rx-Tx time difference type 2 measurement	Yes/No
Measurement related capabilities		Need for downlink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
		Need for uplink compressed mode	Yes/No (per frequency band, UTRA mode and RAT)
General capabilities		ICS version	R99

Table x: FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of HS-DSCH transport-channel bits received within an HS-DSCH TTI	Total number of soft channel bits
Category 1	15	1	20456	172800
Category 2	10	1	14600	115200
Category 3	5	1	7300	57600
Category 4	5	2	7300	28000
Category 5	5	3	7300	19200
Category 6	10	1	14600	153600
Category 7	5	1	7300	96000
Category 8	5	1	7300	76800
Category 9	5	3	7300	48000
Category 10	5	3	7300	38400
Category 11	15	1	[28800]	172800

NOTE: More categories may be added at a later stage.

Table x: 1.28 Mcps TDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes per timeslot	Maximum number of HS-DSCH timeslots per TTI	Maximum number of HS-DSCH transport channel bits that can be received within an HS-DSCH TTI	Total number of soft channel bits	Support of SF=1 for HS-PDSCH
Category 1	8	5	7040	28160	No
Category 2	8	5	7040	56320	No
Category 3	8	5	7040	84480	No
Category 4	8	5	14080	56320	Yes
Category 5	8	5	14080	112640	Yes
Category 6	12	5	10228	40912	No
Category 7	12	5	10228	81824	No
Category 8	12	5	10228	122736	No
Category 9	12	5	14080	56320	Yes
Category 10	12	5	14080	112640	Yes
Category 11	16	5	14080	56320	Yes
Category 12	16	5	14080	112640	Yes
Category 13	16	5	14080	168960	Yes

5.2 Reference UE radio access capability combinations

Based on required UE radio access capabilities to support reference RABs as defined in [2], this clause lists reference UE Radio Access capability combinations. Subclause 5.2.1 defines reference combinations of UE radio access capability parameters common for UL and DL. Subclause 5.2.2 and 5.2.3 define reference combinations of UE radio access capability parameters that are separate for DL and UL respectively. A reference combination for common UL and DL parameters, one combination for UL parameters and one combination for DL parameters together relate to a UE with a certain implementation complexity, that allows support for one or several combined reference RABs. Combinations for UL and DL can be chosen independently. The bit rate supported by the selected combination of common UL and DL parameters needs to be at least as high as the maximum out of the supported bit rates of the selected combination of DL parameters and the selected combination of UL parameters. Different combinations have different levels of implementation complexity.

For defined reference RABs, it is possible to require a UE to meet a certain reference UE radio access capability combination. Each UE needs to have capabilities complying with a given reference radio access capability combination. Each individual radio access capability parameter as defined in Subclause 5.1 shall be signalled.

The reference combination numbers shall not be used in the signalling of UE radio access capabilities between the UE and UTRAN. Reference UE radio access capability combinations provide default configurations that should be used as a basis for conformance testing against reference RABs.

Allowed values of UE capability parameters are limited by the defined range and granularity of values in Subclause 5.1. Values might change depending on further definition of reference RABs for testing.

5.2.1 Combinations of common UE Radio Access Parameters for UL and DL

NOTE: Measurement-related capabilities are not included in the combinations. These capabilities are independent from the supported RABs.

Table 5.2.1.1: UE radio access capability parameter combinations, parameters common for UL and DL

Reference combination of UE Radio Access capability parameters common for UL and DL	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
PDCP parameters						
Support for RFC 2507	No	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1
Support for RFC 3095	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1	No/Yes NOTE 1
Support for loss-less SRNS relocation	No/Yes NOTE 1					
Maximum header compression context space	Not applicable for conformance testing					
RLC parameters						
Total RLC AM buffer size (kbytes)	10	10	50	50	100	500
Maximum number of AM entities	4	4	5	6	8	8
Multi-mode related parameters						
Support of UTRA FDD	Yes/No NOTE 1					
Support of UTRA TDD 3.84 Mcps	Yes/No NOTE 1					
Support of UTRA TDD 1.28 Mcps	Yes/No NOTE 1					
Multi-RAT related parameters						
Support of GSM	Yes/No NOTE 1					
Support of multi-carrier	Yes/No NOTE 1					
UE positioning related parameters						
Standalone location method(s) supported	Yes/No NOTE 1					
Network assisted GPS support	Network based / UE based / Both/ None NOTE 1					
GPS reference time capable	Yes/No NOTE 1					
Support for IPDL	Yes/No NOTE 1					
Support for OTDOA UE based method	Yes/No NOTE 1					
Support for Rx-Tx time difference type 2 measurement	Yes/No NOTE 1					
RF parameters for FDD						
UE power class	3 / 4 NOTE 1					
Tx/Rx frequency separation	190 MHz					
RF parameters for TDD 3.84 Mcps						
Radio frequency bands	A / b / c / a+b / a+c / b+c / a+b+c NOTE 1					
UE power class	2 / 3 NOTE 1					
RF parameters for TDD 1.28 Mcps						
Radio frequency bands	A / b / c / a+b / a+c / b+c/ a+b+c NOTE 1					
UE power class	2 / 3 NOTE 1					

NOTE 1: Options represent different combinations that should be supported with Conformance Tests.

5.2.2 Combinations of UE Radio Access Parameters for DL

Table 5.2.2.1: UE radio access capability parameter combinations, DL parameters

Reference combination of UE Radio Access capability parameters in DL	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
Transport channel parameters						
Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant	640	3840	3840	6400	10240	20480
Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant	640	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant	NA	3840	3840	6400	10240	20480(1) 10240(2) NOTE 5
Maximum number of simultaneous transport channels	8 NOTE 4	8 NOTE 4	8 NOTE 4	8 NOTE 4	8 NOTE 4	16 NOTE 4
Maximum number of simultaneous CCTrCH (FDD)	1 NOTE 3	2/1 NOTE 2 NOTE 3	2/1 NOTE 2 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3
Maximum number of simultaneous CCTrCH (TDD)	2 NOTE 3	3 NOTE 3	3 NOTE 3	3 NOTE 3	4 NOTE 3	4 NOTE 3
Maximum total number of transport blocks received within TTIs that end at the same time	8	8	16	32	64	96
Maximum number of TFC in the TFCS	32	48	96	128	256	1024
Maximum number of TF	32	64	64	64	128	256
Support for turbo decoding	No	Yes	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)						
Maximum number of DPCH/PDSCH codes to be simultaneously received	1	2/1 NOTE 2	2/1 NOTE 2	3	3	3
Maximum number of physical channel bits received in any 10 ms interval (DPCH, PDSCH, S-CCPCH).	1200	3600/2400 NOTE2	7200/4800 NOTE2	19200	28800	57600
Support for SF 512 for DPCH NOTE 6	No	No	No	No	No	No
Support of PDSCH	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes	Yes	Yes
Support of HS-PDSCH	No	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7	Yes/No NOTE 1 NOTE 7
Maximum number of simultaneous S-CCPCH radio links	1	1	1	1	1	1
Support of dedicated pilots for channel estimation	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Physical channel parameters (TDD 3.84 Mcps)						
Maximum number of timeslots per frame	1	2	4	5	10	12
Maximum number of physical channels per frame	8	9	14	28	64	136
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1/16 NOTE 1
Support of PDSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes	Yes
Maximum number of physical channels per timeslot	8	9	9	9	9	13
Physical channel parameters (TDD 1.28 Mcps)						
Maximum number of timeslots per subframe	1	2	3	4	6	6
Maximum number of physical channels per subframe	8	12	18	43	77	77

Reference combination of UE Radio Access capability parameters in DL	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class	2048kbps class
Minimum SF	16	16	16	1/16 NOTE 1	1/16 NOTE 1	1
Support of PDSCH	Yes/no NOTE 1	Yes	Yes	Yes	Yes	Yes
Maximum number of physical channels per timeslot	8	11	14	14	14	14
Support of 8PSK	No	No	No	No	No	Yes

NOTE 1: Options represent different combinations that should be supported with conformance tests.

NOTE 2: Options depend on the support of PDSCH. The highest value is required if PDSCH is supported.

NOTE 3: The given number does not contain the BCH CCTrCH of the current cell nor of the neighbour cells.

NOTE 4: The given number does not contain the BCH of the neighbour cell.

NOTE 5: (1) For FDD and 3.84 Mcps TDD (2) For 1.28 Mcps TDD.

NOTE 6: This UE capability does not relate to the support of CPCH in the uplink for which SF 512 is needed

NOTE 7: When HS-DSCH is configured the UE shall simultaneously support the UE capability values defined in the 64 kbps reference class. However, simultaneous support of PDSCH and HS-PDSCH is not required.

The reference combinations for HS-DSCH capabilities are shown in Tables 5.2.2.2 and 5.2.2.3. ~~This~~These tables are~~is~~ subject to further discussions in RAN WG1 and RAN WG2.

Table 5.2.2.2. FDD UE radio access capability parameter combinations, DL HS-DSCH parameters

~~DL~~ Reference combination ~~with HS-DSCH~~	1.2 Mbps class	3.6 Mbps class	7 Mbps class	10 Mbps class
RLC and MAC-hs parameters				
Total RLC AM and MAC-hs buffer size (kbytes)	50	[100]	[200]	[300]
Maximum number of AM RLC entities	6	6	8	8
PHY parameters				
FDD HS-DSCH category	Category 5	Category 3	Category 2	Category 1
~~**Transport channel parameters**~~				
~~Maximum number of HS-DSCH transport channel bits received within a HS-DSCH TTI~~	~~9600~~	~~9600~~	~~19200~~	~~27200~~
~~**Physical channel parameters**~~				
~~Maximum number of HS-DSCH codes received~~	~~5~~	~~5~~	~~10~~	~~15~~
~~Total number of soft channel bits in HS-DSCH~~	~~19200~~	~~57600~~	~~115200~~	~~172800~~
~~Minimum inter-TTI interval in HS-DSCH~~	~~3~~	~~1~~	~~1~~	~~1~~
~~**Other DL capability**~~				
~~DL reference combination to be supported simultaneously with HS-DSCH (see Table 5.2.2.1)~~	~~64 kbps class NOTE 1~~	~~64 kbps class NOTE 1~~	~~64 kbps class NOTE 1~~	~~64 kbps class NOTE 1~~

~~NOTE 1: Simultaneous support of PDSCH and HS-PDSCH is not required.~~

Table 5.2.2.3. 1.28 Mcps TDD UE radio access capability parameter combinations, DL HS-DSCH parameters

Reference combination	**1.4 Mbps Capability**	**2.0 Mbps Capability**	**2.8 Mbps Capability**
RLC and MAC-HS parameters			
Total RLC AM and MAC-hs buffer size (kbytes)	50	50	100
Maximum number of AM RLC entities	6	6	6
PHY parameters			
1.28 Mcps TDD HS-DSCH Category	Category 1	Category 6	Category 11

5.2.3 Combinations of UE Radio Access Parameters for UL

Table 5.2.3.1: UE radio access capability parameter combinations, UL parameters

Reference combination of UE Radio Access capability parameters in UL	32kbps class	64kbps class	128kbps class	384kbps class	768kbps class
Transport channel parameters					
Maximum sum of number of bits of all transport blocks being transmitted at an arbitrary time instant	640	3840	3840	6400	10240
Maximum sum of number of bits of all convolutionally coded transport blocks being transmitted at an arbitrary time instant	640	640	640	640	640
Maximum sum of number of bits of all turbo coded transport blocks being transmitted at an arbitrary time instant	NA	3840	3840	6400	10240
Maximum number of simultaneous transport channels	4	8	8	8	8
Maximum number of simultaneous CCTrCH(TDD only)	1 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3	2 NOTE 3
Maximum total number of transport blocks transmitted within TTIs that start at the same time	4	8	8	16	32
Maximum number of TFC in the TFCS	16	32	48	64	128
Maximum number of TF	32	32	32	32	64
Support for turbo encoding	No	Yes	Yes	Yes	Yes
Physical channel parameters (FDD)					
Maximum number of DPDCH bits transmitted per 10 ms	1200	2400	4800	9600	19200
Simultaneous reception of SCCPCH and DPCH NOTE 2	No	No	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Simultaneous reception of SCCPCH, DPCH and PDSCH NOTE 2	No	No	No	No	No
Support of PCPCH NOTE 4	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1	Yes/No NOTE 1
Physical channel parameters (TDD 3.84 Mcps)					
Maximum Number of timeslots per frame	1	2	3	7	9
Maximum number of physical channels per timeslot	1	1	1	1	2
Minimum SF	8	2	2	2	2
Support of PUSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Physical channel parameters (TDD 1.28 Mcps)					
Maximum Number of timeslots per subframe	1	2	3	5	5
Maximum number of physical channels per timeslot	1	1	1	1	2
Minimum SF	4	2	2	2	2
Support of PUSCH	Yes/No NOTE 1	Yes	Yes	Yes	Yes
Support of 8PSK	No	No	No	No	No

NOTE 1: Options represent different combinations that should be supported with conformance tests.

NOTE 2: The downlink parameters 'Simultaneous reception of SCCPCH and DPCH' and 'Simultaneous reception of SCCPCH, DPCH and PDSCH' are included in the combinations for uplink as their requirements relate to the uplink data rate. Simultaneous reception of SCCPCH and DPCH is required for the DRAC procedure that is intended for controlling uplink transmissions. In this release of the specification, this is limited to 1 SCCPCH.

NOTE 3: This number does not contain the RACH CCTrCH.

NOTE 4: Support of PCPCH means that the UE supports PCPCH access for both the CA not active case and for the CA active case.

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Contents

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

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- x the first digit:
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is a technical specification of the services provided by the physical layer of UTRA to upper layers.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 23.110: "UMTS Access Stratum; Services and Functions".

[2] 3GPP TS 25.301: "Radio Interface Protocol Architecture".

[3] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".

[4] 3GPP TS 25.222: "Multiplexing and channel coding (TDD)".

[5] 3GPP TS 25.224: "Physical Layer Procedures (TDD)".

[6] 3GPP TS 25.215: "Physical Layer – Measurements (FDD)".

[7] 3GPP TS 25.213: "Spreading and modulation (FDD)".

[8] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[9] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".

[10] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[11] 3GPP TS 25.225: "Physical Layer – Measurements (TDD)".

[12] 3GPP TS 25.221: " Physical channels and mapping of transport channels onto physical channels (TDD)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [3] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ARQ Automatic Repeat Request
BCCH Broadcast Control Channel
BCH Broadcast Channel
C- Control-

CC	Call Control
CCC	CPCH Control Command
CCCH	Common Control Channel
CCH	Control Channel
CCTrCH	Coded Composite Transport Channel
CN	Core Network
CRC	Cyclic Redundancy Check
DC	Dedicated Control (SAP)
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCH	Dedicated Channel
DL	Downlink
DRNC	Drift Radio Network Controller
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
FACH	Forward Link Access Channel
FCS	Fame Check Sequence
FDD	Frequency Division Duplex
GC	General Control (SAP)
HO	Handover
HS-DPCCH	High Speed Dedicated Physical Control Channel
HS-DSCH	High Speed Downlink Shared Channel
HS-SCCH	High Speed Shared Control Channel
HS-SICH	High Speed Shared Information Channel
ITU	International Telecommunication Union
kbps	kilo-bits per second
L1	Layer 1 (physical layer)
L2	Layer 2 (data link layer)
L3	Layer 3 (network layer)
LAC	Link Access Control
LAI	Location Area Identity
MAC	Medium Access Control
MM	Mobility Management
Nt	Notification (SAP)
PCCH	Paging Control Channel
PCH	Paging Channel
PDU	Protocol Data Unit
PHY	Physical layer
PhyCH	Physical Channels
RACH	Random Access Channel
RLC	Radio Link Control
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNTI	Radio Network Temporary Identity
RRC	Radio Resource Control
SAP	Service Access Point
SDU	Service Data Unit
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
TCH	Traffic Channel
TDD	Time Division Duplex
TFCI	Transport Format Combination Indicator
TFRI	Transport Format and Resource Indicator
TFI	Transport Format Indicator
TMSI	Temporary Mobile Subscriber Identity
TPC	Transmit Power Control
TSN	Transmission Sequence Number
U-	User-
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area

UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

4 Interfaces to the physical layer

The physical layer (layer 1) is the lowest layer in the OSI Reference Model and it supports all functions required for the transmission of bit streams on the physical medium.

The physical layer interfaces the Medium Access Control (MAC) Layer and the Radio Resource Control (RRC) Layer as depicted in figure 1.

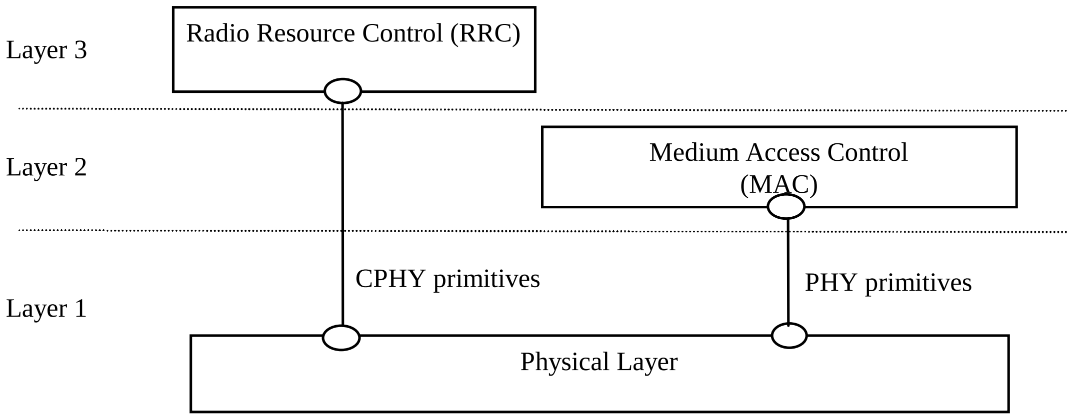


Figure 1: Interfaces with the Physical Layer

4.1 Interface to MAC

The physical layer interfaces the MAC entity of layer 2. Communication between the Physical Layer and MAC is in an abstract way performed by means of PHY-primitives defined which do not constrain implementations.

NOTE: The terms physical layer and layer 1, will be used synonymously in this description.

The PHY-primitives exchanged between the physical layer and the data link layer provide the following functions:

- transfer of transport blocks over the radio interface;
- indicate the status of the layer 1 to layer 2.

4.2 Interface to RRC

The physical layer interfaces the RRC entity of layer 3 in the UE and in the network.

Communication is performed in an abstract way by means of CPHY-primitives. They do not constrain implementations.

The CPHY-primitives exchanged between the physical layer and the Network layer provide the following function:

- control of the configuration of the physical layer.

The currently identified exchange of information across that interface has only a local significance to the UE or Network.

5 Services and functions of the physical layer

5.1 General

The physical layer offers data transport services to higher layers. The access to these services is through the use of transport channels via the MAC sub-layer. The characteristics of a transport channel are defined by its transport format (or format set), specifying the physical layer processing to be applied to the transport channel in question, such as convolutional channel coding and interleaving, and any service-specific rate matching as needed.

The physical layer operates exactly according to the L1 radio frame timing. A transport block is defined as the data accepted by the physical layer to be jointly CRC protected~~encoded~~ . The transmission block timing is then tied exactly to the TTI ~~is L1 frame~~ timing, e.g. every transmission block is generated precisely every ~~10ms, or a multiple of 10 ms~~TTI.

A UE can set up multiple transport channels simultaneously, each having own transport characteristics (e.g. offering different error correction capability). Each transport channel can be used for information stream transfer of one radio bearer or for layer 2 and higher layer signalling messages.

The multiplexing of ~~these~~ transport channels onto the same or different physical channels is carried out by L1. ~~In addition, t~~Except for HS-DSCH the Transport Format Combination Indication field (TFCI) shall uniquely identify the transport format used by each transport channel of the Coded Composite Transport Channel within the current radio frame.

In case of HS-DSCH the identification of the transport format and channelisation codes is realised with the Transport Format and Resource Indication field (TFRI) on an associated shared control channel.

5.2 Overview of L1 functions

The physical layer performs the following main functions:

- FEC encoding/decoding of transport channels;
- measurements and indication to higher layers (e.g. FER, SIR, interference power, transmission power, etc…);
- macrodiversity distribution/combining and soft handover execution;
- error detection on transport channels;
- multiplexing of transport channels and demultiplexing of coded composite transport channels;
- rate matching;
- mapping of coded composite transport channels on physical channels;
- modulation and spreading/demodulation and despreading of physical channels;
- frequency and time (chip, bit, slot, frame) synchronisation;
- closed-loop power control;
- power weighting and combining of physical channels;
- RF processing;
- support of Uplink Synchronisation as defined in [5] (TDD only);
- timing advance on uplink channels (TDD only).

5.3 L1 interactions with L2 retransmission functionality

Provided that the RLC PDUs are mapped one-to-one onto the Transport Blocks, Error indication may be provided by L1 to L2. For that purpose, the L1 CRC can be used for individual error indication of each RLC PDU.

The L1 CRC ~~will then~~may serve multiple purposes:

- error indication for uplink macro diversity selection combining (L1);
- error indication for each erroneous Transport Block in transparent and unacknowledged mode RLC;
- quality indication;
- error indication for each erroneous Transport Block in acknowledged mode RLC.

Regardless of the result of the CRC check, all Transport Blocks are delivered to L2 along with the associated error indications for transport channel other than HS-DSCH. In case of HS-DSCH an error indication is provided to L2 in case of CRC failure.

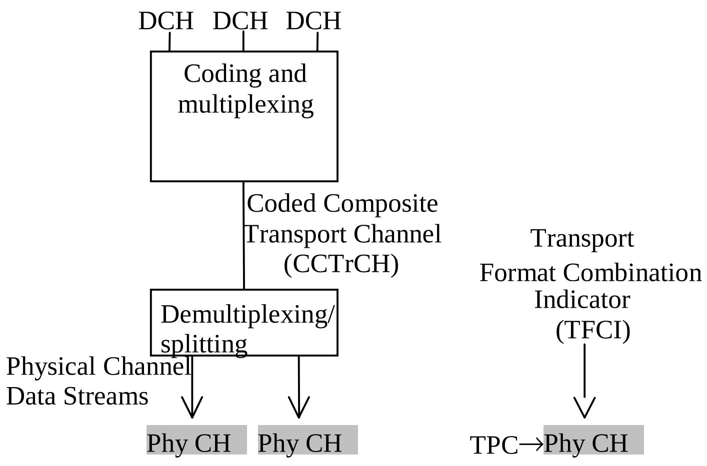
In case of HS-DSCH retransmissions of Transport Blocks may be requested before transport blocks are delivered to L2.

6 Model of physical layer of the UE

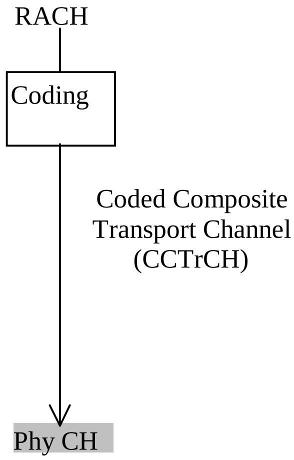
6.1 Uplink models

Figure 2 shows models of the UE's physical layer in the uplink for both FDD and TDD mode. It shows the models for DCH, RACH, CPCH (the latter two used in FDD mode only) and USCH (TDD only). Some restriction exist for the use of different types of transport channel at the same time, these restrictions are described in the clause "UE Simultaneous Physical Channel combinations". More details can be found in [3] and [4].

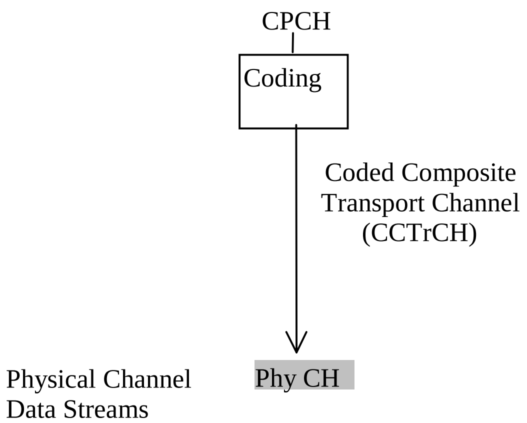
DCH model



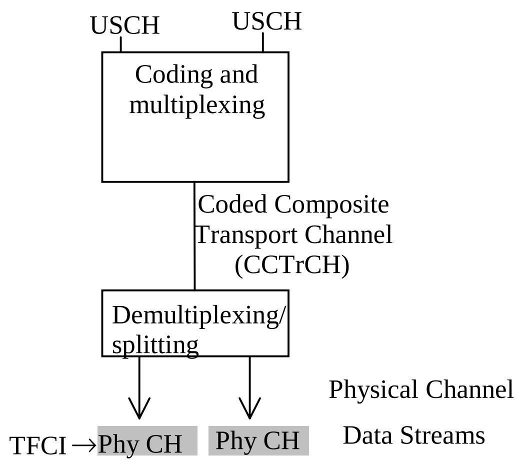
RACH model



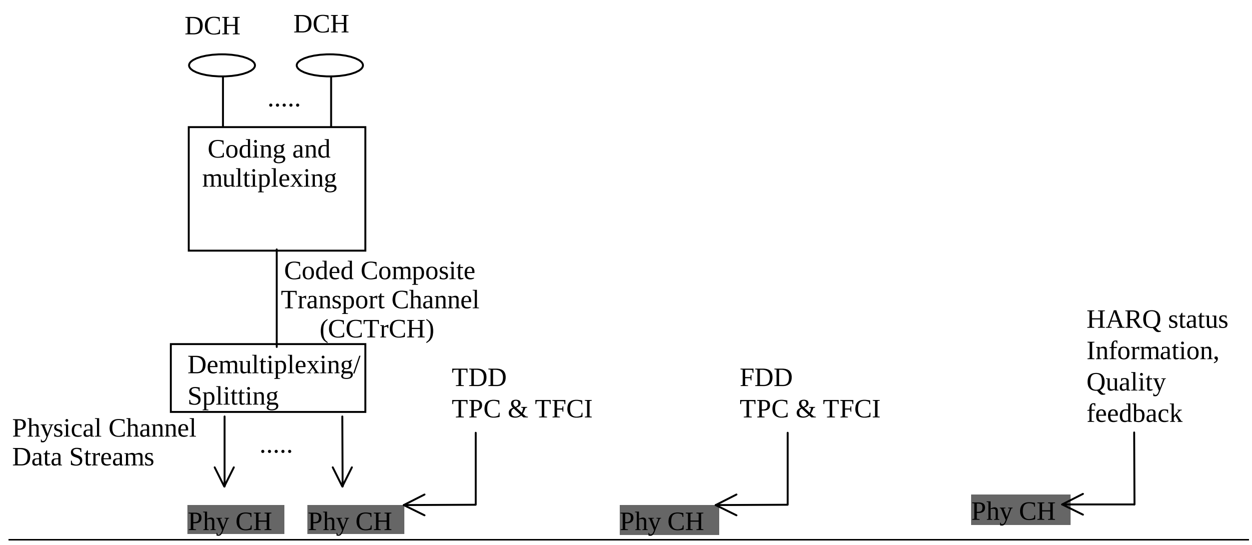
CPCH model



USCH model



DCH model with HS-DSCH support



NOTE 1: CPCH is for FDD only.

NOTE 2: USCH is for TDD only.

Figure 2: Model of the UE's physical layer - uplink

The DCH model shows that one or several DCHs can be processed and multiplexed together by the same coding and multiplexing unit. The detailed functions of the coding and multiplexing unit are not defined in the present document but in [3] and [4]. The single output data stream from the coding and multiplexing unit is denoted *Coded Composite Transport Channel (CCTrCH).*

The bits on a CCTrCH Data Stream can be mapped on the same Physical Channel and should have the same C/I requirement.

On the downlink, multiple CCTrCH can be used simultaneously with one UE. In the case of FDD, only one fast power control loop is necessary for these different CCtrCH, but the different CCtrCH can have different C/I requirements to provide different QoS on the mapped Transport Channels. In the case of TDD, different power control loops can be applied for different CCTrCH. One physical channel can only have bits coming from the same CCTrCH.

On the uplink and in the case of FDD, only one CCTrCH can be used simultaneously. On the uplink and in the case of TDD, multiple CCTrCH can be used simultaneously.

When multiple CCTrCH are used by one UE, one or several TFCI can be used, but each CCTrCH has only zero or one corresponding TFCI. In the case of FDD, these different words are mapped on the same DPCCH. In the case of TDD, these different TFCIs can be mapped on different DPCH.

The data stream of the CCTrCH is fed to a data demultiplexing/splitting unit that demultiplexes/splits the CCTrCH's data stream onto one or several *Physical Channel Data Streams*.

The current configuration of the coding and multiplexing unit is either signalled to, or optionally blindly detected by, the network for each 10 ms frame. If the configuration is signalled, it is represented by the *Transport Format Combination Indicator (TFCI)* bits. Note that the TFCI signalling only consists of pointing out the current transport format combination within the already configured transport format combination set. In the uplink there is only one TFCI representing the current transport formats on all DCHs of one CCTrCH simultaneously. In FDD mode, the physical channel data stream carrying the TFCI is mapped onto the physical channel carrying the power control bits and the pilot. In TDD mode the TFCI is time multiplexed onto the same physical channel(s) as the DCHs. The exact locations and coding of the TFCI are signalled by higher layers.

The DCH and USCH have the possibility to perform Timing Advance in TDD mode.

The model for the RACH case shows that RACH is a common type transport channel in the uplink. RACHs are always mapped one-to-one onto physical channels (PRACHs), i.e. there is no physical layer multiplexing of RACHs, and there can only be one RACH TrCH and no other TrCH in a RACH CCTrCH. Service multiplexing is handled by the MAC layer. In one cell several RACHs/PRACHs may be configured. If more than one PRACH is configured in a cell, the UE performs PRACH selection as specified in [4].

In FDD, the RACHs mapped to the PRACHs may all employ the same Transport Format and Transport Format Combination Sets, respectively. It is however also possible that individual RACH Transport Format Sets are applied on each available RACH/PRACH.

In TDD, there is no TFCI transmitted in the burst, and therefore each RACH is configured with a single transport format within its TFS. The RACHs mapped to the PRACHs may all employ the same Transport Format. It is however also possible that individual RACH Transport Formats are applied on each available RACH/PRACH combination.

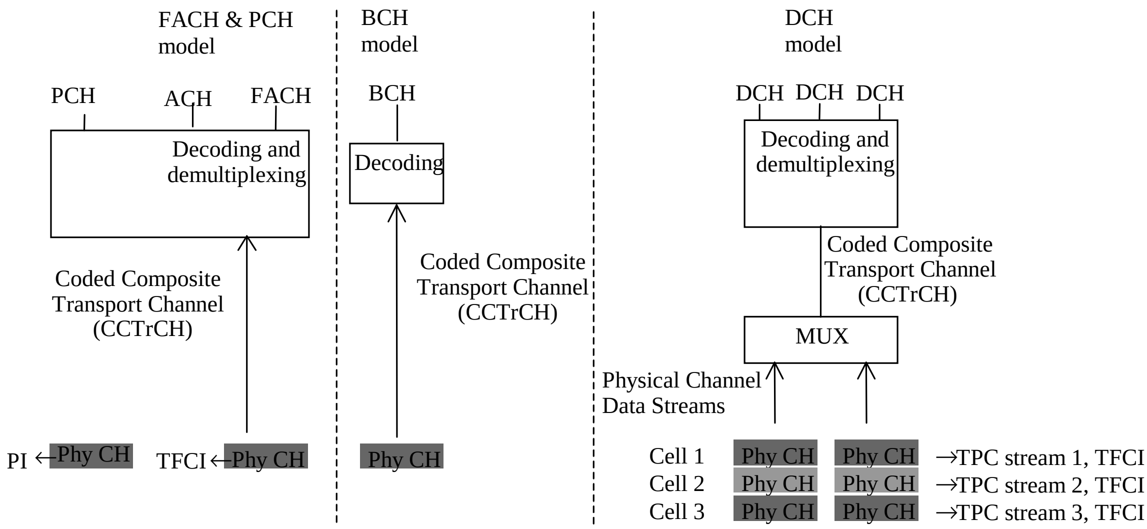
The available pairs of RACH and PRACHs and their parameters are indicated in system information. In FDD mode, the various PRACHs are distinguished either by employing different preamble scrambling codes, or by using a common scrambling code but distinct (non-overlapping) partitions of available signatures and available subchannels. In TDD mode, the various PRACHs are distinguished either by employing different timeslots, or by using a common timeslot but distinct (non-overlapping) partitions of available channelisation codes and available subchannels. Examples of RACH/PRACH configurations are given in [6].

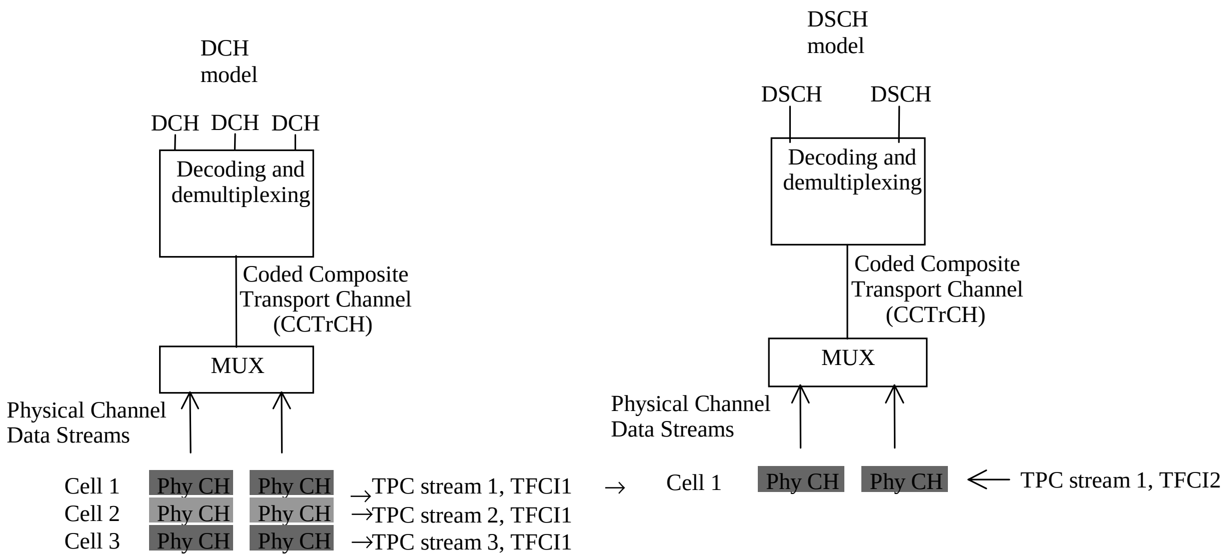
The CPCH, which is another common type transport channel, has a physical layer model as shown in figure2. There is always a single CPCH transport channel mapped to a PCPCH physical channel which implies a one-to-one correspondence between a CPCH TFI and the TFCI conveyed on PCPCH. There can only be one CPCH TrCH and no other TrCH in a CPCH CCTrCH. A CPCH transport channel belongs to a CPCH set which is identified by the application of a common, CPCH set-specific scrambling code for access preamble and collision detection, and multiple PCPCH physical channels. Each PCPCH shall employ a subset of the Transport Format Combinations implied by the Transport Format Set of the CPCH set. A UE can request access to CPCH transport channels of a CPCH set, which is assigned when the service is configured for CPCH transmission.

In FDD in case of a configured HS-DSCH one physical channel (HS-DPCCH) is configured for quality indication and HARQ status information. In TDD in case of a configured HS-DSCH a shared physical channel (HS-SICH) is configured for feedback indication and HARQ status information.

6.2 Downlink models

Figure 3 and figure 4 show the model of the UE's physical layer for the downlink in FDD and TDD mode, respectively. Note that there is a different model for each transport channel type.





Note (1) – TFCI1 indicates the DCH specific TFC and TFCI2 indicates the DSCH specific TFC and also the PDSCH channelisation code(s)

DCH associated with DSCH

DCH model with HS-DSCH(s)

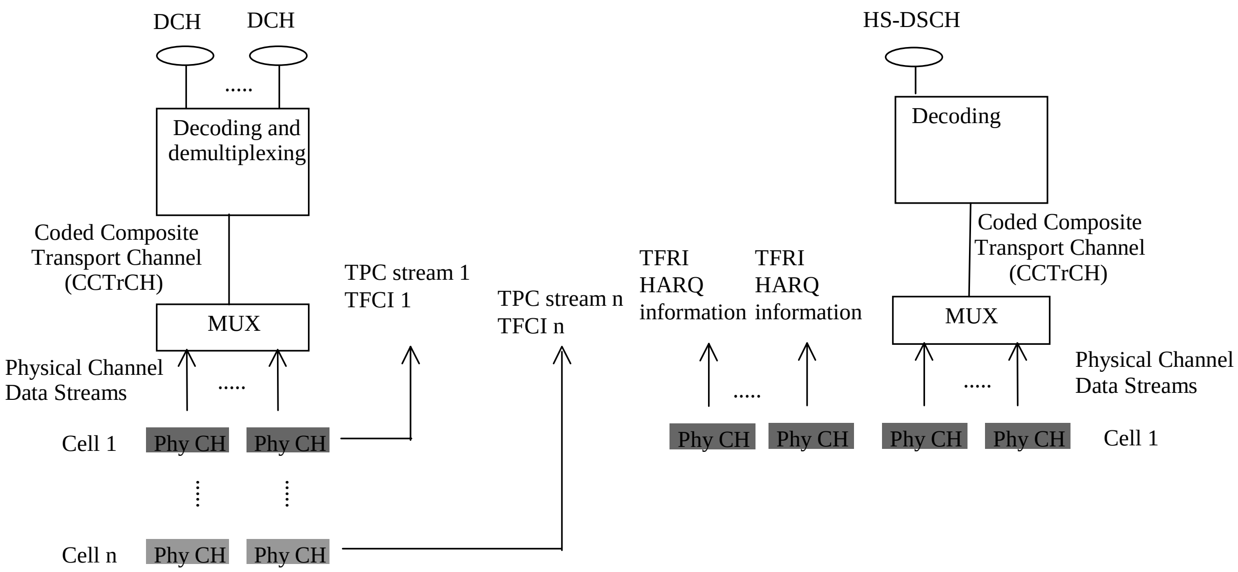
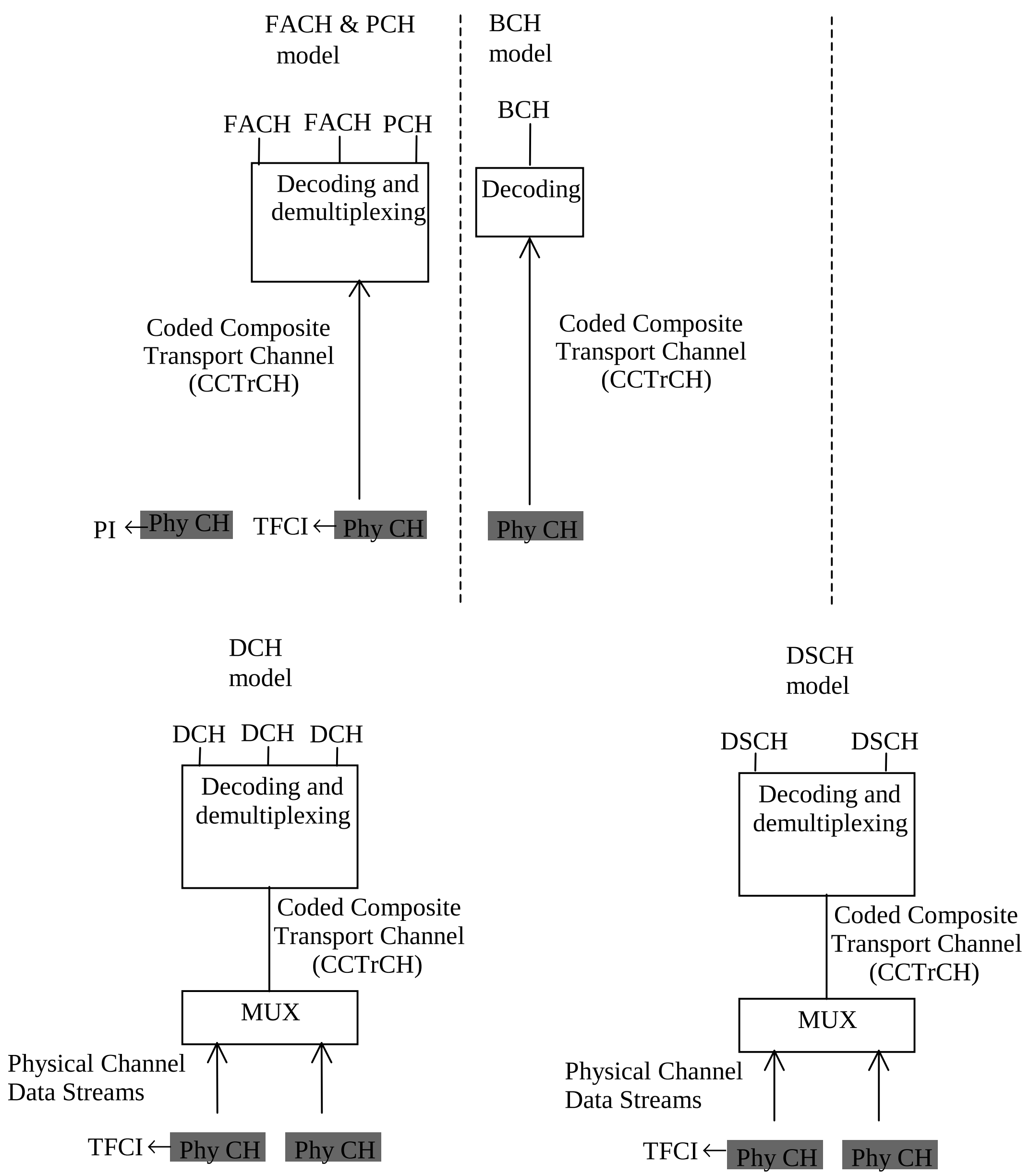


Figure 3: Model of the UE's physical layer - downlink FDD mode


FACH & PCH model
BCH model
FACH
FACH
PCH
Decoding and demultiplexing
BCH
Decoding
Coded Composite Transport Channel (CCTrCH)
Coded Composite Transport Channel (CCTrCH)
PI
Phy CH
TFCI
Phy CH
Phy CH
DCH model
DSCH model
DCH
DCH
DCH
Decoding and demultiplexing
Coded Composite Transport Channel (CCTrCH)
MUX
Physical Channel Data Streams
TFCI
Phy CH
Phy CH
DSCH
DSCH
Decoding and demultiplexing
Coded Composite Transport Channel (CCTrCH)
MUX
Physical Channel Data Streams
TFCI
Phy CH
Phy CH

DCH model with HS-DSCH(s)

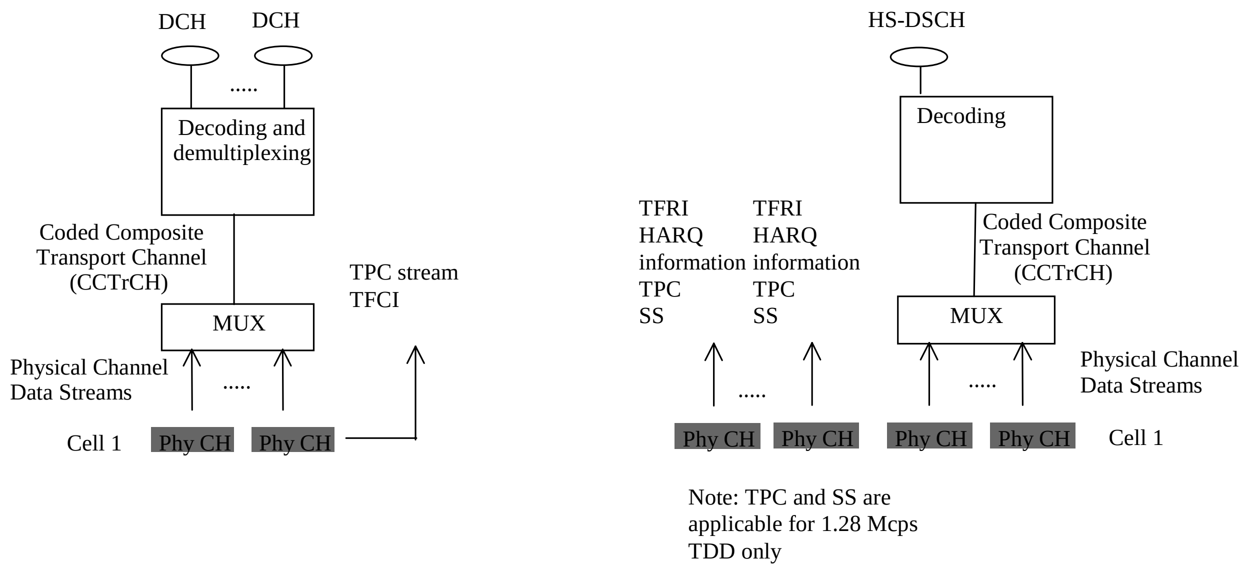


Figure 4: Model of the UE's physical layer – downlink TDD mode

For the DCH case, the mapping between DCHs and physical channel data streams works in the same way as for the uplink. Note however, that the number of DCHs, the coding and multiplexing etc. may be different in uplink and downlink.

In the FDD mode, the differences are mainly due to the soft and softer handover. Further, the pilot, TPC bits and TFCI are time multiplexed onto the same physical channel(s) as the DCHs. Further, the definition of physical channel data stream is somewhat different from the uplink. In TDD mode the TFCI is time multiplexed onto the same physical channel(s) as the DCHs. The exact locations and coding of the TFCI are signalled by higher layers.

Note that it is logically one and the same physical data stream in the active set of cells, even though physically there is one stream for each cell. The same processing and multiplexing is done in each cell. The only difference between the cells is the actual codes, and these codes correspond to the same spreading factor.

The physical channels carrying the same physical channel data stream are combined in the UE receiver, excluding the pilot, and in some cases the TPC bits. TPC bits received on certain physical channels may be combined provided that UTRAN has informed the UE that the TPC information on these channels is identical.

A PCH and one or several FACH can be encoded and multiplexed together forming a CCTrCH. Similarly as in the DCH model there is one TFCI for each CCTrCH for indication of the transport formats used on each PCH and FACH. The PCH is associated with a separate physical channel carrying page indicators (PIs) which are used to trigger UE reception of the physical channel that carries PCH. A FACH or a PCH can also be individually mapped onto a separate physical channel. The BCH is always mapped onto one physical channel without any multiplexing with other transport channels, and there can only be one BCH TrCH and no other TrCH in a BCH CCTrCH.

For each HS-DSCH TTI, each HS-SCCH carries HS-DSCH-related downlink signalling for one UE. The following information is carried on the HS-SCCH:

- Transport Format and Resource Indicator (TFRI)
- Hybrid-ARQ-related Information (HARQ information)

7 Formats and configurations for L1 data transfer

7.1 General concepts about Transport Channels

Layer 2 is responsible for the mapping of data onto L1 via the L1/L2 interface that is formed by the transport channels. In order to describe how the mapping is performed and how it is controlled, some definitions and terms are required. The required definitions are given in the following subclauses. Note that the definitions are generic for all transport channel types, i.e. not only for DCHs.

All Transport Channels are defined as unidirectional (i.e. uplink or downlink). This means that a UE can have simultaneously (depending on the services and the state of the UE) one or several transport channels in the downlink, and one or more Transport Channel in the uplink.

7.1.1 Transport Block

This is the basic unit exchanged between L1 and MAC, for L1 processing.

Layer 1 adds a CRC for each Transport Block.

7.1.2 Transport Block Set

This is defined as a set of Transport Blocks, which are exchanged between L1 and MAC at the same time instance using the same transport channel.

In case of HS-DSCH the Transport Block Set consists of one Transport Block only.

7.1.3 Transport Block Size

This is defined as the number of bits in a Transport Block. The Transport Block Size is always fixed within a given Transport Block Set, i.e. all Transport Blocks within a Transport Block Set are equally sized.

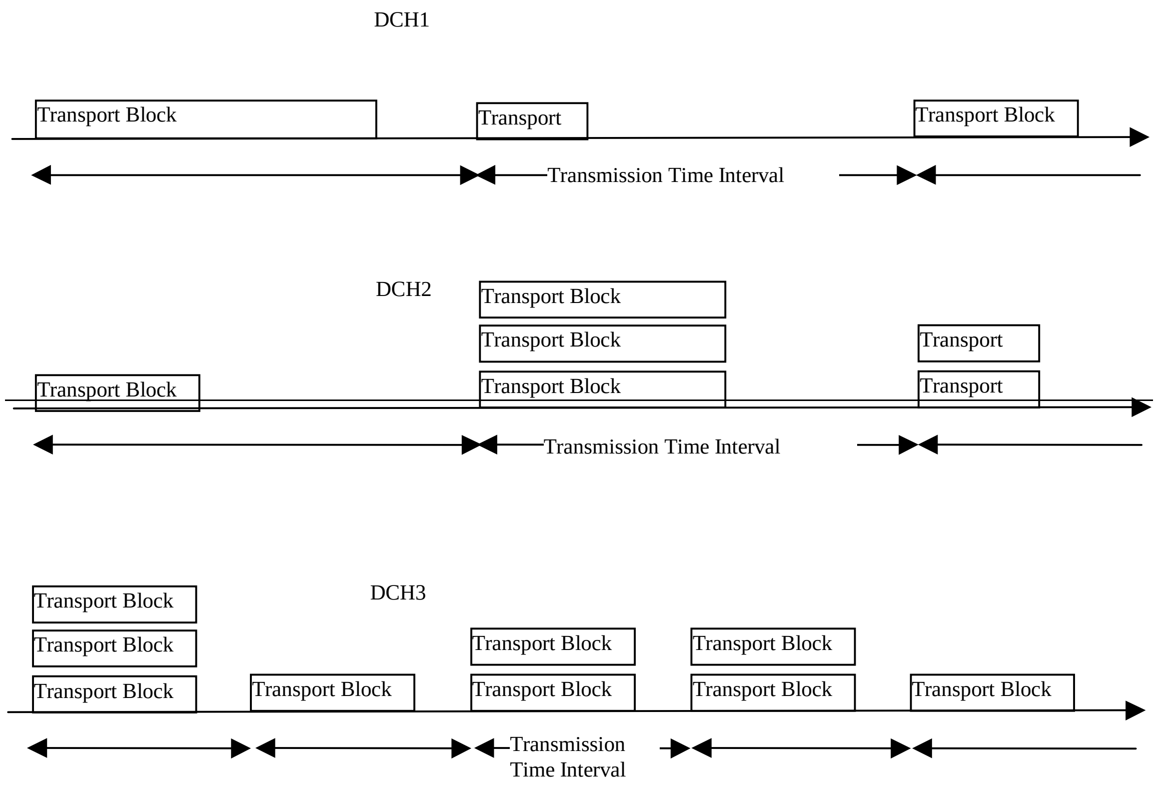
7.1.4 Transport Block Set Size

This is defined as the number of bits in a Transport Block Set.

7.1.5 Transmission Time Interval

This is defined as the inter-arrival time of Transport Block Sets, and is equal to the periodicity at which a Transport Block Set is transferred by the physical layer on the radio interface. It is always a multiple of the minimum interleaving period (e.g. 10ms, the length of one Radio Frame). The MAC delivers one Transport Block Set to the physical layer every TTI.

Figure 6 shows an example where Transport Block Sets, at certain time instances, are exchanged between MAC and L1 via three parallel transport channels. Each Transport Block Set consists of a number of Transport Blocks. The Transmission Time Interval, i.e. the time between consecutive deliveries of data between MAC and L1, is also illustrated.


DCH1
Transport Block
Transport
Transport Block
Transmission Time Interval
DCH2
Transport Block
Transport Block
Transport Block
Transport Block
Transport
Transport
Transmission Time Interval
DCH3
Transport Block
Transport Block
Transport Block
Transport Block
Transport Block
Transport Block
Transport Block
Transport Block
Transport Block
Transmission
Time Interval

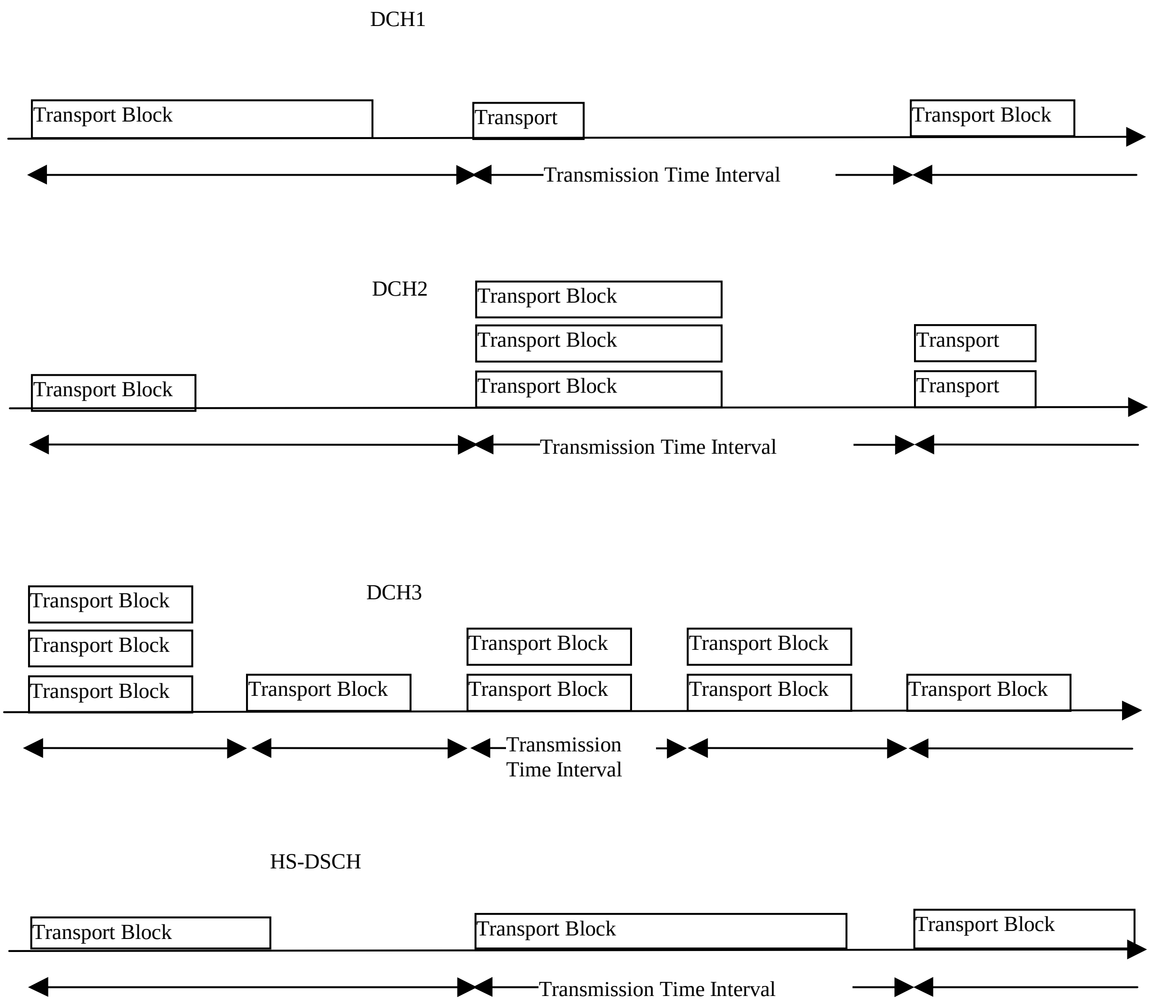


Figure 6: Exchange of data between MAC and L1

7.1.6 Transport Format

This section applies to transport channel types other than HS-DSCH.

This is defined as a format offered by L1 to MAC (and vice versa) for the delivery of a Transport Block Set during a Transmission Time Interval on a Transport Channel. The Transport Format constitutes of two parts – one *dynamic* part and one *semi-static* part.

Attributes of the dynamic part are:

- Transport Block Size;
- Transport Block Set Size;
- Transmission Time Interval (optional dynamic attribute for TDD only);

Attributes of the semi-static part are:

- Transmission Time Interval (mandatory for FDD, optional for the dynamic part of TDD NRT bearers);
- error protection scheme to apply:
  - type of error protection, turbo code, convolutional code or no channel coding;
  - coding rate;

- static rate matching parameter;

- size of CRC.

In the following example, the Transmission Time Interval is seen as a semi-static part.

EXAMPLE:
Dynamic part: {320 bits, 640 bits}, Semi-static part: {10ms, convolutional coding only, static rate matching parameter = 1}.

An empty Transport Format is defined as a Transport Format that has Block Set Size equal to zero.

7.1.6a Transport Format for HS-DSCH

This is defined as a format offered by L1 to MAC (and vice versa) for the delivery of a transport block during a Transmission Time Interval on a Transport Channel. The Transport Format constitutes of three parts – one *dynamic* part, one semi-*static* part and one static part.

The Transport Format for HS-DSCH is always explicitely signalled. There is no support of blind transport format detection.

Attributes of the dynamic part are:

- Transport block size (same as Transport block set size)
- Redundancy version/Constellation
- Modulation scheme

Attributes of the semi-static part are:

- no semi-static attributes are defined

Attributes of the static part are:

- Transmission time interval. The Transmission time interval is fixed to 2ms in FDD, 10ms in 3.84 Mcps TDD and 5ms in 1.28 Mcps TDD
- error protection scheme to apply:
  - type of error protection is turbo coding
  - coding rate is 1/3
  - size of CRC is 24 bits

7.1.7 Transport Format Set

This is defined as the set of Transport Formats associated to a Transport Channel.

The semi-static parts of all Transport Formats are the same within a Transport Format Set.

Effectively the ~~first two attributes of the dynamic part~~ Transport Block Size and Transport Block Set Size form the instantaneous bit rate on the Transport Channel. Variable bit rate on a Transport Channel may, depending on the type of service, which is mapped onto the transport channel, be achieved by changing between each Transmission Time Interval one of the following:

1. the Transport Block Set Size only (not applicable for HS-DSCH);
2. both the Transport Block Size and the Transport Block Set Size

   Example 1 for DCHs:

   - dynamic part: {20 bits, 20 bits}; {40 bits, 40 bits}; {80 bits, 80 bits}; {160 bits, 160 bits}.
   - Semi-static part: {10ms, Convolutional coding only, static rate matching parameter = 1}

Example 2 for DCHs:

- dynamic part: {320 bits, 320 bits}; {320 bits, 640 bits}; {320 bits, 1 280 bits}.
- Semi-static part: {10ms, Convolutional coding only, static rate matching parameter = 2}.

Example 3 for HS-DSCH

- dynamic part: {320 bits, 320 bits, Redundancy version 1, QPSK}; {640, 640, Redundancy version 1, QPSK}; {1280, 1280, Redundancy version 2, 16QAM}
- static part: See 7.1.6a

The first example may correspond to a Transport Channel carrying a speech service, requiring blocks delivered on a constant time basis. In the second example, which illustrates the situation where a non-real time service is carried by the Transport Channel, the number of blocks delivered per Transmission Time Interval varies between the different Transport Formats within the Transport Format Set. Referring to figure 6, the Transport Block Size is varied on DCH1 and DCH2. That is, a Transport Format Set where the dynamic part has a variable Transport Block Size has been assigned for DCH1. On DCH3 it is instead only the Transport Block Set Size that is varied. That is, the dynamic parts of the corresponding Transport Format Sets only include variable Transport Block Set Sizes.

7.1.8 Transport Format Combination

The layer 1 multiplexes one or several Transport Channels, and for each Transport Channel, there exists a list of transport formats (Transport Format Set) which are applicable. Nevertheless, at a given point of time, not all combinations may be submitted to layer 1 but only a subset, the Transport Format Combination. This is defined as an authorised combination of the combination of currently valid Transport Formats that can be submitted simultaneously to the layer 1 for transmission on a Coded Composite Transport Channel of a UE, i.e. containing one Transport Format from each Transport Channel.

EXAMPLE:

DCH1:
Dynamic part: {20 bits, 20 bits}, Semi-static part: {10ms, Convolutional coding only, static rate matching parameter = 2};

DCH2:
Dynamic part: {320 bits, 1 280 bits}, Semi-static part: {10ms, Convolutional coding only, static rate matching parameter = 3};

DCH3:
Dynamic part: {320 bits, 320 bits}, Semi-static part: {40ms, Turbo coding, static rate matching parameter = 2}.

An empty Transport Format Combination is defined as a Transport Format Combination that is only made up of empty Transport Formats.

7.1.9 Transport Format Combination Set

This is defined as a set of Transport Format Combinations on a Coded Composite Transport Channel.

EXAMPLE for DCHs:

- dynamic part:
  - combination 1: DCH1: {20 bits, 20 bits}, DCH2: {320 bits, 1280 bits}, DCH3: {320 bits, 320 bits};
  - combination 2: DCH1: {40 bits, 40 bits}, DCH2: {320 bits, 1280 bits}, DCH3: {320 bits, 320 bits};
  - combination 3: DCH1: {160 bits, 160 bits}, DCH2: {320 bits, 320 bits}, DCH3: {320 bits, 320 bits}
- semi-static part:
  - DCH1: {10ms, Convolutional coding only, static rate matching parameter = 1};
  - DCH2: {10ms, Convolutional coding only, static rate matching parameter = 1};

- DCH3: {40ms, Turbo coding, static rate matching parameter = 2}.

The Transport Format Combination Set is what is given to MAC for control. However, the assignment of the Transport Format Combination Set is done by L3. When mapping data onto L1, MAC chooses between the different Transport Format Combinations given in the Transport Format Combination Set. Since it is only the dynamic part that differ between the Transport format Combinations, it is in fact only the dynamic part that MAC has any control over.

The semi-static part, together with the target value for the L1 closed loop power control, correspond to the service attributes:

- quality (e.g. BER);
- transfer delay.

These service attributes are then offered by L1. However, it is L3 that guarantees that the L1 services are fulfilled since it is in charge of controlling the L1 configuration, i.e. the setting of the semi-static part of the Transport Formats. Furthermore, L3 controls the target for the L1 closed loop power control through the outer loop power control (which actually is a quality control rather than a power control).

Note that a Transport Format Combination Set need not contain all possible Transport Format Combinations that can be formed by Transport Format Sets of the corresponding Transport Channels. It is only the allowed combinations that are included. Thereby a maximum total bit rate of all transport channels of a Code Composite Transport Channel can be set appropriately. That can be achieved by only allowing Transport Format Combinations for which the included Transport Formats (one for each Transport Channel) do not correspond to high bit rates simultaneously.

The selection of Transport Format Combinations can be seen as a fast part of the radio resource control. The dedication of these fast parts of the radio resource control to MAC, close to L1, means that the flexible variable rate scheme provided by L1 can be fully utilised. These parts of the radio resource control should be distinguished from the slower parts, which are handled by L3. Thereby the bit rate can be changed very fast, without any need for L3 signalling.

7.1.10 Transport Format Indicator (TFI)

The TFI is a label for a specific transport format within a transport format set. It is used in the inter-layer communication between MAC and L1 each time a transport block set is exchanged between the two layers on a transport channel.

When the DSCH is associated with a DCH, the TFI of the DSCH also indicates the physical channel (i.e. the channelisation code) of the DSCH that has to be listened to by the UE.

7.1.11 Transport Format Combination Indicator (TFCI)

This is a representation of the current Transport Format Combination.

There is a one-to-one correspondence between a certain value of the TFCI and a certain Transport Format Combination. The TFCI is used in order to inform the receiving side of the currently valid Transport Format Combination, and hence how to decode, de-multiplex and deliver the received data on the appropriate Transport Channels.
The TFCI is not used for the HS-DSCH.

MAC indicates the TFI to Layer 1 at each delivery of Transport Block Sets on each Transport Channel. Layer 1 then builds the TFCI from the TFIs of all parallel transport channels of the UE , processes the Transport Blocks appropriately and appends the TFCI to the physical control signalling. Through the detection of the TFCI the receiving side is able to identify the Transport Format Combination. For FDD, in case of limited Transport Format Combination Sets the TFCI signalling may be omitted, instead relying on blind detection. Nevertheless, from the assigned Transport Format Combinations, the receiving side has all information it needs in order to decode the information and transfer it to MAC on the appropriate Transport Channels.

The multiplexing and exact rate matching patterns follow predefined rules and may therefore be derived (given the Transport Format Combinations) by transmitter and receiver without signalling over the radio interface.

When the meaning of the TFCI field needs to be reconfigured, two procedures can be used depending on the level of reconfiguration:

- **complete reconfiguration of TFCI:** in this procedure all TFCI values are reinitialised and new values are defined instead. The complete reconfiguration requires an explicit synchronisation between the UE and UTRAN regarding when the reconfiguration becomes valid.

- **incremental reconfiguration of TFCI:** in this procedures, a part of the TFCI values before and after the reconfiguration remain identical (note that this must be true for at least a TFCI that carry the signalling connection). This procedure supports addition, removal or redefinition of TFCI values. This procedure does not require an explicit execution time. This procedure may imply the loss of some user-plane data.

7.1.12 Rate matching

Two levels of rate matching are defined on the radio interface:

- a static rate matching per Transport Channel. The static rate matching is part of the semi-static attributes of the Transport Channel; static rate matching is not applicable to HS-DSCH

- a dynamic rate matching per CCTrCH. The dynamic rate matching adjusts the size of the physical layer data payload to the physical channel as requested by RRC.

The static rate matching and the dynamic rate matching to be applied by the physical layer are indicated by RRC to the physical layer.

In FDD, RRC is also responsible for configuring the physical layer on whether:

- Blind Rate Detection or TFCI is used;

- dynamic rate matching is applied or not on the downlink.

7.1.13 HARQ information

Hybrid ARQ is defined for HS-DSCH. With the help of the HARQ information the UE is enabled to identify the process being used for the transport block that is received on the HS-DSCH. The HARQ information also includes information that indicates whether a new data block is transmitted for the first time or a retransmission. Furthermore it is used to correctly decode the received data.

7.1.14 Transport Format and Resource Indication (TFRI)

The TFRI includes information about the dynamic part of the HS-DSCH transport format, including transport block set size and modulation scheme. The TFRI also includes information about the set of physical channels (channelisation codes) onto which HS-DSCH is mapped in the corresponding HS-DSCH TTI.

7.2 Types of Transport Channels

A general classification of transport channels is into two groups:

- common channels; and

- dedicated channels (where the UEs can be unambiguously identified by the physical channel, i.e. code and frequency).

Common transport channel types are:

1. Random Access Channel(s) (RACH) characterised by:

    - existence in uplink only;

    - limited data field;

    - collision risk;

    - open loop power control.

2. Forward Access Channel(s) (FACH) characterised by:
   - existence in downlink only;
   - possibility to use slow power control;
   - possibility to change rate fast (each 10ms); and
   - lack of inner loop power control.
3. Broadcast Channel (BCH) characterised by:
   - existence in downlink only;
   - low fixed bit rate; and
   - requirement to be broadcast in the entire coverage area of the cell.
4. Paging Channel (PCH) characterised by:
   - existence in downlink only;
   - association with a physical layer signal, the Page Indicator, to support efficient sleep mode procedures; and
   - requirement to be broadcast in the entire coverage area of the cell.
5. Downlink Shared Channel(s) (DSCH) characterised by:
   - existence in downlink only;
   - possibility to use beamforming;
   - possibility to use slow power control;
   - possibility to use inner loop power control, when associated with dedicated channel(s);
   - possibility to be broadcast in the entire cell;
   - always associated with another channel (DCH or FACH (TDD)).
6. CPCH Channel characterised by:
   - existence in FDD only;
   - existence in uplink only;
   - inner loop power control on the message part;
   - possibility to change rate fast;
   - collision detection;
   - open loop power estimate for pre-amble power ramp-up.
7. Uplink Shared channel (USCH) characterised by:
   - used in TDD only;
   - existence in uplink only;
   - possibility to use beam forming;
   - possibility to use power control;
   - possibility to change rate fast;
   - possibility to use Uplink Synchronisation;
   - possibility to use Timing advance.

8. High Speed Downlink Shared Channel (HS-DSCH) characterised by:

    - existence in downlink only;
    - possibility to use beamforming
    - possibility of applying link adaption by varying the modulation, coding and transmit power
    - possibility to be broadcast in the entire cell
    - always associated with a DPCH and one or more shared physical control channel

Dedicated transport channel type:

1. Dedicated Channel (DCH) characterised by:

    - existing in uplink or downlink;
    - possibility to use beam forming;
    - possibility to change rate fast (each 10ms);
    - inner loop power control;
    - possibility to use timing advance in uplink (TDD only);
    - possibility to use Uplink Synchronisation.

To each transport channel, there is an associated Transport Format (for transport channels with a fixed or slow changing rate) or an associated Transport Format Set (for transport channels with fast changing rate).

7.3 Compressed Mode

Compressed Mode is defined as the mechanism whereby certain idle periods are created in radio frames so that the UE can perform measurements during these periods (more details can be found in [3]).

Compressed Mode is obtained by layer 2 using transport channels provided by the layer 1 as follows:

- compressed mode is controlled by the RRC layer, which configures the layer 2 and the physical layer;
- the number of occurrences of compressed frames is controlled by RRC, and can be modified by RRC signalling;
- it is under the responsibility of the layer 2 if necessary and if possible to either buffer some layer 2 PDUs (typically at the RLC layer for NRT services) or to rate-adapt the data flow (similarly to GSM) so that there is no loss of data because of compressed mode. This will be service dependent and controlled by the RRC layer.

For measurements in compressed mode, a transmission gap pattern sequence is defined. A transmission gap pattern sequence consists of alternating transmission gap patterns 1 and 2, and each of these patterns in turn consists of one or two transmission gaps. The transmission gap pattern structure, position and repetition are defined with physical channel parameters described in [6]. In addition, the UTRAN configures compressed mode pattern sequences with the following parameters:

- **TGMP:** Transmission Gap pattern sequence Measurement Purpose: This parameter defines the purpose this transmission gap pattern sequence is intended for. The following values are used:
    - for TDD measurements, one compressed mode pattern sequence can be configured with purpose 'TDD measurement',
    - for FDD measurements, one compressed mode pattern sequence can be configured with purpose 'FDD measurement',
    - for GSM measurements, three simultaneous compressed mode pattern sequences can be configured with purposes 'GSM carrier RSSI measurement', 'Initial BSIC identification' and 'BSIC re-confirmation',
- **TGPSI:** Transmission Gap Pattern Sequence Identifier selects the compressed mode pattern sequence for which the parameters are to be set. The range of TGPSI is [1 to <MaxTGPS>].

The UE shall support a total number of simultaneous compressed mode pattern sequences, which is determined by the UE's capability to support each of the measurement types categorised by the TGMP. For example, a UE supporting FDD and GSM shall support four simultaneous compressed mode pattern sequences and a UE supporting FDD and TDD shall support two simultaneous compressed mode pattern sequences.

When using simultaneous pattern sequences, it is the responsibility of the NW to ensure that the compressed mode gaps do not overlap and are not scheduled to overlap the same frame. Gaps exceeding the maximum gap length shall not be processed by the UE and shall interpreted as a faulty message. If the UE detects overlapping gaps, it shall process the gap from the pattern sequence having the lowest TGPSI.

8 UE Simultaneous Physical Channels combinations

This clause describes the requirements from the UE to send and receive on multiple Transport Channels, which are mapped on different physical channels simultaneously depending on the service capabilities and requirements. The clause will describe the impacts on the support for multiple services (e.g. speech call and SMS-CB) depending on the UE capabilities.

8.1 FDD Uplink

The table describes the possible combinations of FDD physical channels that can be supported in the uplink on the same frequency by one UE simultaneously.

Table 1: FDD Uplink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	PRACH	RACH	Mandatory	The PRACH physical channel includes the preambles and the message.
2	PCPCH consisting of one control and one data part during the message portion	CPCH	Depending on UE radio access capabilities	The PCPCH physical channel includes the preambles and the message. The maximum channel bit rate is depende~~a~~nt on UE radio access capabilities.
3	DPCCH+DPDCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCHs and the maximum channel bit rate are depende~~a~~nt on UE radio access capabilities.
4	DPCCH+ more than one DPDCH	One or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are depend~~a~~ent on UE radio access capabilities.
5	DPCCH+one or more DPDCH+ HS-DPCCH	One or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum bit rate are dependent on UE radio access capabilities. This combination is required in case HS-DSCH(s) are configured.

8.2 FDD Downlink

The table describes the possible combinations of FDD physical channels that can be supported in the downlink on the same frequency by one UE simultaneously.

Table 2: FDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory dependent on UE radio access capabilities	Comment
1	PCCPCH	BCH	Mandatory	
2	SCCPCH	FACH Or PCH Or FACH + PCH	Mandatory	The maximum channel bit rate that can be supported is dependent on the UE radio access capabilities. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to the FACH.
3	PCCPCH + SCCPCH	BCH + (FACH or PCH or (FACH + PCH))	Mandatory	Simultaneous reception of PCCPCH and SCCPCH is only needed at occurrences when the UE needs to read system information on BCH while being in CELL_FACH state, i.e. continuous reception of both PCCPCH and SCCPCH at the same time is not required. The requirement holds for PCCPCH and SCCPCH sent in different cells or in the same cell. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to the FACH.
4	SCCPCH + AICH	(FACH or PCH or (FACH + PCH))+ RACH in uplink Or (FACH or PCH or (FACH + PCH))+ CPCH in uplink	Mandatory	The maximum channel bit rate that can be supported is dependent on the UE radio access capabilities. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to the FACH. This physical channel combination facilitates the preamble portion of the CPCH in the uplink
5	SCCPCH + DPCCH	(FACH or PCH or (FACH + PCH))+ CPCH in uplink	Depending on UE radio access capabilities	This physical channel combination facilitates the message portion of the CPCH in the uplink The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to the FACH.
6	More than one SCCPCH	More than one (FACH or PCH or (FACH + PCH))	Depending on UE radio access capabilities	The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to the FACH.
7	PICH	N/A	Mandatory	
8	DPCCH + DPDCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
9	DPCCH + more than one DPDCH	One or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.

	Physical Channel Combination	Transport Channel Combination	Mandatory dependent on UE radio access capabilities	Comment
10	One or more PDSCH + DPCCH + one or more DPDCH	One or more DSCH coded into a single CCTrCH + one or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
11	SCCPCH + DPCCH + one or more DPDCH	FACH + one or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination of physical channels is used for DRAC control of an uplink DCH and for receiving services such as cell broadcast or multicast whilst in connected mode. NOTE 1
12	SCCPCH + one or more PDSCH + DPCCH + one or more DPDCH	FACH + one or more DSCH coded into a single CCTrCH + one or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination of physical channels is used for simultaneous DSCH and DRAC control of an uplink DCH.NOTE 1
13	One DPCCH + more than one DPDCH	More than one DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	
14	PCCPCH (neighbour cell) + DPCCH + one or more DPDCH + zero, one, or more PDSCH	BCH (neighbour cell) + one or more DCHs + zero, one or more DSCH	Mandatory	This combination is required by a UE in CELL_DCH state to be able to read the SFN of a neighbouring cell and support "SFN-CFN observed time difference" and "SFN-SFN observed time difference" measurements.
15	DPCCH + one or more DPDCH + one HS-SCCH + one or more HS-PDSCH	One HS-DSCH coded into a single CCTrCH + one or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
16	PCCPCH (neighbour cell) + DPCCH + one or more DPDCH + one or more HS-SCCH + one or more HS-PDSCH	BCH (neighbour cell) + one or more DCHs + one HS-DSCH	Depending on UE capability	This combination is required by a UE in CELL_DCH state to be able to read the SFN of a neighbouring cell and support “SFN-CFN observed time difference” and “SFN-SFN observed time difference” measurements while HS-DSCH(s) are configured.

NOTE 1: When both DRAC and CTCH are configured in one cell, the UTRAN should transmit DRAC info and CTCH info on the same S-CCPCH in order to minimize the number of S-CCPCH to be read by the UE. A UE which supports the simultaneous reception of S-CCPCH and DPCH, shall be capable of switching between different S-CCPCH in order to listen to DRAC info and CTCH info that are not scheduled in the same time intervals. If the UE is ordered to listen to CTCH and DRAC info on different S-CCPCH in the same time interval, it shall listen to DRAC info in priority.

8.3 TDD Uplink

8.3.1 3.84 Mcps TDD Uplink

The table addresses the possible combinations of 3.84 Mcps TDD physical channels that can be supported in the uplink by one UE simultaneously on the same frequency in any one 10ms frame. In 3.84 Mcps TDD a physical channel corresponds to one code, one timeslot and one frequency.

Table 3: 3.84 Mcps TDD Uplink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	PRACH	RACH	Mandatory	
2	DPCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination is used as reference measurement channel.
3	One or more than one DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
4	PRACH + one or more DPCH	RACH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination may be used for shared channel operation only. At least the usage of two timeslots is required.
5	One or more PUSCH	One or more USCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination is used for shared channel operation.
6	PRACH + one or more PUSCH	RACH + One or more USCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination may be used for shared channel operation only. At least the usage of two timeslots is required.
7	One or more PUSCH + one or more DPCH	One or more USCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination may be used for shared channel operation.
8	PRACH + one or more PUSCH + one or more DPCH	RACH + one or more USCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination may be used for shared channel operation. At least the usage of two timeslots is required.
9	One or more DPCH + HS-SICH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	

8.3.2 1.28 Mcps TDD Uplink

The table addresses the possible combinations of 1.28 Mcps TDD physical channels that can be supported in the uplink by one UE simultaneously on the same frequency in the TDD 1.28 Mcps option in any one 5 ms subframe. In 1.28 Mcps TDD a physical channel corresponds to one code, one timeslot, one frequency.

Table 4: 1.28 Mcps TDD Uplink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	UpPCH	N/A	Mandatory	UpPCH is used to establish the uplink synchronisation.
2	PRACH	RACH	Mandatory	
3	UpPCH + One DPCH	One or more DCH coded into a single CCTrCH	Mandatory	One DPCH is needed as reference measurement channel. UpPCH transmission to target cell in case of handover.
4	One DPCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities This combination is required for the reference measurement channel.
5	More than one DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities.
6	UpPCH+ one or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
7	PRACH + one or more DPCHs	RACH + one or more DCH coded into one or more than one CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
8	One or more PUSCH	One or more USCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is required for UE that operate shared channels.
9	UpPCH + one or more PUSCH	One or more USCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination may be used for shared channel operation only.
10	PRACH + one or more PUSCH	RACH + One or more USCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination may be used for shared channel operation only
11	One or more PUSCH + one or more DPCH	One or more USCH coded onto one or more CCTrCH + one or more DCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
12	UpPCH + one or more PUSCH + one or more DPCH	One or more USCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination may be used for shared channel operation.
13	PRACH + one or more PUSCH + one or more DPCH	RACH + one or more USCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination may be used for shared channel operation.
14	One or more DPCH + HS-SICH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	

8.4 TDD Downlink

8.4.1 3.84 Mcps TDD Downlink

The table describes the possible combinations of 3.84 Mcps TDD physical channels that can be supported in the downlink by one UE simultaneously on the same frequency in any one 10ms frame, where a 3.84 Mcps TDD physical channel corresponds to one code, one timeslot and one frequency.

Depending on UE radio capabilities UEs may be required to decode occasionally P-CCPCH of its own cell in the following Physical Channel Combinations to maintain open loop power control and/or acquire parameters for RACH access: 4, 6, 7, 8, 9, 10, 11, 12.

Depending on UE radio capabilities UEs may be required to decode occasionally one P-CCPCH of neighbour cells in the following Physical Channel Combinations for handover: 6, 8, 11, 12.

Table 5: 3.84 Mcps TDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	P-CCPCH + One S-CCPCH	BCH and PCH and/or one or more FACH	Mandatory	
2	P-CCPCH	BCH	Mandatory	
3	S-CCPCH	FACH or/and PCH	Mandatory	
4	More than one S-CCPCH	one or more FACH+ one or more PCH	Depending on UE capabilities	
5	PICH	N/A	Mandatory	
6	Three or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
7	One or two DPCH	One or more DCH coded into a single CCTrCH	Mandatory	This combination is used for reference measurement channel.
8	One or more S-CCPCH + one or more DPCH	PCH and/or one or more FACH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The number of DCHs and the maximum channel bit rate are dependent on the UE radio access capabilities. This combination is used for shared channel operation only.
9	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination is used for shared channel operation.
10	One or more PDSCH + one or more S-CCPCH	PCH and/or one or more FACH + one or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination is used for shared channel operation.
11	One or more PDSCH + one or more DPCH	One or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination is used for shared channel operation.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
12	One or more PDSCH + one or more S-CCPCH + one or more DPCH	PCH and/or one or more FACH + one or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination is used for shared channel operation.
13	One or more DPCH + one or more HS-PDSCH + one or more HS-SCCH	One or more DCH coded into one or more CCTrCH + one or more HS-DSCH coded into one CCTrCH	Depending on UE radio access capabilities	
NOTE: Reference: [12].				

8.4.2 1.28 Mcps TDD Downlink

The table addresses the possible combinations of 1.28 Mcps TDD physical channels that can be supported in the downlink by one UE simultaneously on the same frequency in any one 5ms subframe. In 1.28 Mcps TDD a physical channel corresponds to one code, one timeslot, one frequency.

Depending on UE radio capabilities UEs may be required to decode occasionally P-CCPCH of its own cell in the following Physical Channel Combinations: 5, 11, 12, 13, 14, 15, 16, 17.

To support handover it depends on UE capabilities if a UE can support the occasional decoding of neighbour cell P-CCPCH in the physical channel combinations 8, 9, 10, 11, 15,16, 17.

Table 6: 1.28 Mcps TDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	FPACH	N/A	Mandatory	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE
2	P-CCPCH	BCH	Mandatory	
3	S-CCPCH	FACH or/and PCH	Mandatory	
4	P-CCPCH +S-CCPCH	BCH + (FACH or/and PCH)	Mandatory	
5	More than one S-CCPCH	one or more FACH+ one or more PCH	Depending on UE capabilities	
6	PICH	N/A	Mandatory	
7	FPACH + P-CCPCH + none, one or more S-CCPCH	BCH + (none, one or more FACH+ none, one or more PCH)	Depending on UE capabilities	
8	2 DPCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCH and the maximum channel bit rate are dependent on UE radio access capabilities This channel is used as reference measurement channel
9	One or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
10	FPACH + one or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE. The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
11	One or more S-CCPCH + one or more DPCH	(One or more FACH or/and PCH) + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
12	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is required for UE that operate shared channels.
13	FPACH + one or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is desirable but not essential for UE supporting shared channels.
14	One or more S-CCPCH +one or more PDSCH	(One or more FACH and/or PCH) + One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is desirable but not essential for UE supporting shared channels.
15	One or more PDSCH + one or more DPCH	One or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	This configuration is required for UE that operate shared channels and dedicated channels simultaneously.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
16	FPACH + one or more PDSCH + one or more DPCH	one or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities.	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE. This configuration is desirable but not essential for UE supporting shared channels and dedicated channels simultaneously.
17	One or more S-CCPCH + one or more PDSCH + one or more DPCH	(One or more FACH and/or PCH) + one or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities.	This configuration is desirable but not essential for UE supporting shared channels and dedicated channels simultaneously.
18	One or more DPCH + one or more HS-PDSCH + one or more HS-SCCH	One or more DCH coded into one or more CCTrCH + one or more HS-DSCH coded into one CCTrCH	Depending on UE radio access capabilities	

9 Measurements provided by the physical layer

One of the key services provided by the physical layer is the measurement of various quantities, which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The standard will not specify the method to perform these measurements or stipulate that the list of measurements provided in this clause must all be performed. While some of the measurements are critical to the functioning of the network and are mandatory for delivering the basic functionality (e.g., handover measurements, power control measurements), others may be used by the network operators in optimising the network (e.g., radio environment).

Measurements may be made periodically and reported to the upper layers or may be event-triggered (e.g., primary CCPCH becomes better than the previous best primary CCPCH). Another reporting strategy may combine the event triggered and the periodical approach (e.g. falling of link quality below a certain threshold initiates periodical reporting). The measurements are tightly coupled with the service primitives in that the primitives' parameters may constitute some of the measurements.

The list and frequency of measurements, which the physical layer reports to higher layers, is described in this clause. The detailed definition of measurement control and abilities is contained in [6] for FDD and [11] for TDD. The measurement performance requirements together with accuracy, range and mapping is specified in [9] for TDD and in [10] for FDD.

The measurement quantities measured by the physical layer shall be such that the following principles are applied:

- for handover measurements, the decoding of parameters on the BCCH logical channel of monitored neighbouring cells, should not, in general, be needed for calculating the measurement result. If there is a need to adjust the measurement result with parameters broadcast on the PCCPCH, these parameters shall be provided by the UTRAN in inband measurement control messages. There may be some exceptions to this rule;

  EXAMPLE:
  It may be necessary to decode the SFN of the measured neighbouring cell for time difference measurements.

- in idle mode or in RRC connected mode using common Transport Channels, the UE shall be able to monitor cells for cell reselection, without being required to frequently decode parameters on the BCCH logical channel of the monitored neighbouring cells. The decoding frequency of these parameters, set by the cell reselection algorithm, should be such that UE standby times are not significantly decreased.

9.1 Model of physical layer measurements

This subclause describes a model for how the physical layer measurements are performed. This model applies both to the UE and Node B measurements.

The measurement model for physical layer measurements is represented in the figure 7.

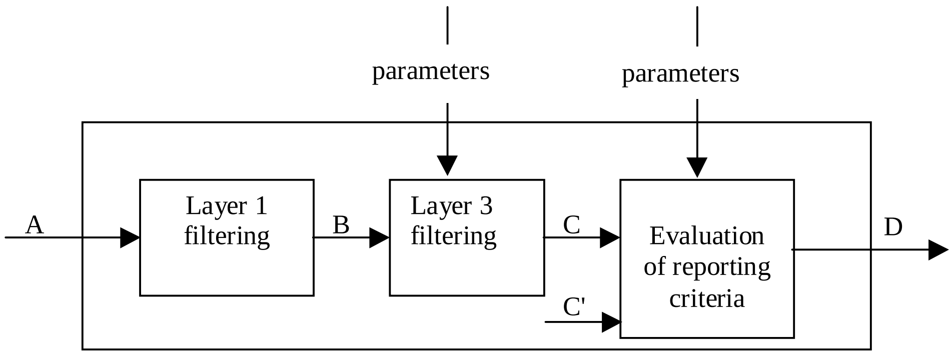


Figure 7: Measurement model

The model is described below:

- **A:** measurements (samples) internal to the physical layer in support to the measurements to be provided to higher layers;
- **Layer 1 filtering:** internal layer 1 filtering of the inputs measured at point A. Exact filtering is implementation dependant. How the measurements are actually executed in the physical layer by an implementation (inputs A and Layer 1 filtering) in not constrained by the standard i.e. the model does not state a specific sampling rate or even if the sampling is periodic or not. What the standard specifies is the performance objective and reporting rate at point B in the model. The performance objectives for the physical layer measurements are specified in [9] and [10];
- **B:** A measurement reported by layer 1 after layer 1 filtering. The reporting rate at point B is defined by the standard and is measurement type specific. It is chosen to be equal to the measurement period over which performance objectives are defined in [9] and [10]. As a consequence, by setting the layer 3 filtering to "no filtering", the performance of the layer 1 implementation can be tested. This means that the physical layer can organise its internal measurements between these reporting at point B to meet the performance requirements;
- **Layer 3 filtering:** Filtering performed on the measurements provided at point B. The Layer 3 filters are standardised and the configuration of the layer 3 filters is provided by RRC signalling (UE measurements) or NBAP signalling (Node B measurements);
- **C:** A measurement after processing in the layer 3 filter. The reporting rate is identical to the reporting rate at point B and is therefore also measurement type specific. Although this is not shown in the figure, one measurement can be used by a multiplicity of evaluation of reporting criteria;
- **Evaluation of reporting criteria:** This checks whether actual measurement reporting is necessary at point D i.e. whether a message need to be sent to higher layers on the radio interface or Iub interface. The evaluation can be based on more than one flow of measurements at reference point C e.g. to compare between different measurements. This is illustrated by input C, C', etc. The UE shall evaluate the reporting criteria at least every time a new measurement result is reported at point C, C' etc. The reporting criteria are standardised and the configuration is provided by RRC signalling (UE measurements) or NBAP signalling (Node B measurements). Examples are periodic reporting and event based reporting. In case periodical reporting is in use and if the reporting interval is different from the filtering period defined by the layer 3 filter, the last measurement result filtered by the L3 filter shall be used as the value of the reported result. In case event triggered reporting is in use and the reporting criteria is fulfilled, the last measurement result filtered by the L3 filter shall be used as the value for reporting criteria evaluation and as the value of the reported result. This applies also for any additional measurements that shall be reported as a consequence of the event;
- **D:** a measurement report information (message) sent on the radio or Iub interface.

9.2 UE Measurements

For definitions of the measurements, see [6] and [11].

9.2.1 SFN-CFN observed time difference

This measure is mandatory for UE.

Measurement	SFN-CFN observed time difference
Source	L1 (UE)
Destination	RRC (RNC) for handover
Reporting Trigger	On-demand, Event-triggered
Description	Time difference between the SFN of the target neighbouring cell and the CFN in the UE.

9.2.2 Observed time difference to GSM cell

This measure is mandatory for UE capable of handover to GSM.

Measurement	Observed time difference to GSM cell
Source	L1 (UE)
Destination	RRC (RNC) for maintenance and handover to GSM
Reporting Trigger	On-demand, Event-triggered
Description	Time difference between a UTRA cell and a GSM cell.

9.2.3 CPICH E_c/N_0

This measure is mandatory for UE with FDD mode capability.

Measurement	CPICH Ec/No
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	Periodic, on demand and event triggered
Description	The received energy per chip of the CPICH divided by the power density in the frequency band.

9.2.4 Void

9.2.5 CPICH RSCP

This measure is mandatory for UE with FDD mode capability.

Measurement	CPICH RSCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Description	Received signal code power of the CPICH.

9.2.6 P-CCPCH RSCP

This measure is mandatory for UE with TDD mode capability.

Measurement	P-CCPCH RSCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Description	Received signal code power of the P-CCPCH

9.2.7 Timeslot ISCP

This measure is mandatory for UE with TDD mode capability.

Measurement	Timeslot ISCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Description	Interference Signal Code Power is the interference on the received signal in a specified timeslot.

9.2.8 Void

9.2.9 SIR

This measure is mandatory for UE with TDD mode capability.

Measurement	SIR
Source	L1(UE)
Destination	RRC (UE,RNC)
Reporting Trigger	Periodic, once every power control cycle , event triggered
Description	Signal to Interference Ratio

9.2.10 UTRA carrier RSSI

This measure is mandatory for UE.

Measurement	UTRA carrier RSSI
Source	L1(UE)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered, on demand
Description	Received Signal Strength Indicator, the wideband received power within the relevant channel bandwidth. For TDD this is measured in specified timeslots.

9.2.11 GSM carrier RSSI

This measure is mandatory for UE with GSM capability.

Measurement	GSM carrier RSSI
Source	L1(UE)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered, on demand
Description	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Details are specified in the GSM specification 05.08

9.2.12 Transport channel BLER

This measure is mandatory for UE.

Measurement	Transport channel BLER (BLock Error Rate)
Source	L1(UE)
Destination	RRC (RNC,UE)
Reporting Trigger	Periodic, on demand
Description	Estimation of the transport channel block error rate (BLER).

9.2.13 UE transmitted power

This measure is mandatory for UE.

Measurement	UE transmitted power
Source	L1(UE)
Destination	RRC (UE,RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Description	Total transmitted power on one carrier. For TDD this is measured in specified timeslots.

9.2.14 UE Rx-Tx time difference

This measure is mandatory for UE with FDD mode capability.

Measurement	UE Rx-Tx time difference
Source	L1 (UE)
Destination	RRC (RNC)
Reporting Trigger	On-demand, periodic, event-triggered
Description	Time difference between the UE uplink DPCCH/DPDCH frame transmission and the first detected path (in time) of the downlink DPCH frame from the measured radio link. Type 1 and Type 2 are defined.

9.2.15 SFN-SFN Observed time difference

This measure is mandatory for UE.

Measurement	SFN-SFN observed time difference
Source	L1 (UE)
Destination	RRC (RNC)
Reporting Trigger	On-demand, Event-triggered
Description	Time difference between a specific reference UTRA cell and a target UTRA cell. Type 1 and Type 2 are defined.

9.2.16 UE GPS Timing of Cell Frames for UE positioning

This measure is mandatory for UE that has the capability to measure GPS reference time.

Measurement	UE GPS Timing of Cell Frames for UE positioning
Source	L1 (UE)
Destination	RRC (RNC-UE positioning)
Reporting Trigger	On-demand, Event-triggered, Periodic
Description	The timing between UTRA cell and GPS Time Of Week.

9.2.17 Timing Advance (T_{ADV}) for 1.28 Mcps TDD

This measure is mandatory for 1.28 Mcps TDD UE.

Measurement	Timing Advance (T_{ADV}) for 1.28 Mcps TDD
Source	L1 (UE)
Destination	RRC (RNC)
Reporting Trigger	On-demand, Event-triggered, Periodic
Description	Difference between the uplink transmission of the UE and the downlink reception.

9.3 UTRAN Measurements

9.3.1 Received total wide band power

Measurement	Received total wide band power
Source	L1 (Node B)
Destination	RRC(RNC)
Reporting Trigger	On-demand, Event-triggered, Periodic
Description	The received wide band power including noise generated in the receiver, within the bandwidth defined by the pulse shaping filter. For TDD mode, this is measured in specified timeslots.

9.3.2 Transmitted carrier power

Measurement	Transmitted carrier power
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Description	Transmitted carrier power is the ratio between the total transmitted power on one DL carrier from one UTRAN access point, compared to the maximum power possible to use on that DL carrier at this moment of time. For TDD mode, this is measured in specified timeslots.

9.3.3 Transmitted code power

Measurement	Transmitted code power
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Description	Transmitted Code Power is the transmitted power on one carrier, one scrambling and one channelisation code. For TDD mode, this is measured in specified timeslots.

9.3.4 Void

9.3.5 Physical channel BER

Measurement	Physical channel BER
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	On-demand, Event-triggered, periodic
Description	The Physical channel BER is an estimation of the average bit error rate (BER) on the DPCCH of a Radio Link Set. This measurement applies to FDD mode only.

9.3.6 Transport channel BER

Measurement	Transport channel BER
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	On-demand, Event-triggered, periodic
Description	The transport channel BER is an estimation of the average bit error rate (BER) data part.

9.3.7 RX timing deviation

Measurement	RX timing deviation
Source	L1 (Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Description	The difference of the time of arrival of the UL transmissions in relation to the arrival time of a signal with zero propagation delay. This measurement is applicable for TDD mode.

9.3.8 Timeslot ISCP

Measurement	Timeslot ISCP
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	periodic or event triggered
Description	Interference on Signal Code Power, is the interference on the received signal in a specified timeslot. This measurement is applicable is applicable to TDD mode only.

9.3.9 RSCP

Measurement	RSCP
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	periodic or event triggered
Description	Received Signal Code Power is the received power on DPCH or PRACH or PUSCH. This measurement is applicable for TDD mode only.

9.3.10 Round Trip Time

Measurement	Round Trip Time
Source	L1(Node B or LMU)
Destination	RRC (RNC-UE positioning)
Reporting Trigger	on demand, event triggered
Description	This is an estimate of the round trip time of signals between the Node B and the UE This measurement is applicable for FDD mode only.

9.3.11 Void

9.3.12 Acknowledged PRACH preambles

Measurement	Acknowledged PRACH preambles
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered, On demand
Description	This measurement indicates the number of positive acquisition indicators transmitted per access frame on each AICH. This measurement is applicable for FDD mode only.

9.3.13 Detected PCPCH access preambles

Measurement	Detected PCPCH Access preambles
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered, On demand
Description	This measurement indicates the total number of detected access preambles per access frame on the PCPCHs belonging to a CPCH set. This measurement is applicable for FDD mode only.

9.3.14 Acknowledged PCPCH access preambles

Measurement	Acknowledged PCPCH access preambles
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered, On demand
Description	This measurement indicates the total number of acknowledged PCPCH access preambles per access frame on the PCPCHs. where an access frame consists of fifteen access slots from access slot #0 to access slot #14. This measurement is applicable for FDD mode only.

9.3.15 SIR

Measurement	SIR
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Description	Signal to Interference Ratio.

9.3.16 PRACH/PCPCH Propagation Delay

Measurement	Propagation delay
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Event triggered, periodic
Description	The one-way propagation delay as measured during either PRACH or PCPCH access. This measurement is applicable for FDD mode only.

9.3.17 UTRAN GPS Timing of Cell Frames for UE positioning

Measurement	UTRAN GPS Timing of Cell Frames for UE positioning
Source	L1 (LMU)
Destination	RRC (RNC-UE positioning)
Reporting Trigger	On-demand, Event-triggered, Periodic
Description	This is the absolute time reference measurement in respect to GPS Time Of Week for the transmission of a particular frame.

9.3.18 SIR ERROR

Measurement	SIR ERROR
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Description	Signal to Interference Ratio Error This measurement is applicable for FDD cells only.

9.3.19 Received SYNC_UL Timing Deviation

Measurement	Received SYNC_UL Timing Deviation
Source	L1 (Node B)
Destination	RRC (RNC)
Reporting Trigger	Event triggered
Definition	'Received SYNC_UL Timing Deviation' is the time difference $UpPCH_{POS} = UpPTS_{Rxpath} - UpPTS_{TS}$ Where $UpPTS_{Rxpath}$: time of the reception in the Node B of the SYNC_UL to be used in the uplink synchronization process $UpPTS_{TS}$: time instance two symbols prior to the end of the DwPCH according to the Node B internal timing

9.3.20 Cell Sync Burst Timing

Measurement	Cell Sync Burst Timing
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Definition	Cell sync burst timing is the time of start (defined by the first detected path in time) of the cell sync burst of a neighbouring cell. Type 1 is used for the initial phase of Node B synchronization. Type 2 is used for the steady-state phase of Node B synchronization.

9.3.21 Cell Sync Burst SIR

Measurement	Cell Sync Burst SIR
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Definition	Signal to Interference Ratio for the cell sync burst, defined as: RSCP/Interference, where:

9.3.22 SFN-SFN Observed time difference

Measurement	SFN-SFN observed time difference
Source	L1 (LMU)
Destination	RRC (RNC-UE positioning)
Reporting Trigger	On-demand, Periodic, On Modification
Description	Measured time between reception of signal from a specific reference UTRA cell and from a neighbour UTRA cell.

10 Primitives of the physical layer

The Physical layer interacts with other entities as illustrated in figure 1. The interactions with the MAC layer and the RRC layer are shown in terms of primitives where the primitives represent the logical exchange of information and control between the physical layer and higher layers. They do not specify or constrain implementations. The (adjacent) layers connect to each other through Service Access Points (SAPs). Primitives, therefore, are the conveyers of the information exchange and control through SAPs.

Four types of primitives are used for the present document, as follows.

- **REQUEST (REQ):**
  - This type is used when a higher layer is requesting a service from a lower layer.
- **INDICATION (IND):**
  - This type is used by a lower layer providing a service to notify its higher layer of activities concerning that higher layer.
- **RESPONSE (RESP):**
  - This type is used by a higher layer providing the indicated service to respond to its lower layer that the activity has been completed.
- **CONFIRM (CNF):**
  - This type is used by a lower layer providing the requested service to confirm to the higher layer that the activity has been completed.

The primitives defined below are for local communications between MAC and L1, as well as RRC and L1 in the same protocol stack.

For the physical layer two sets of primitives are defined:

- **Primitives between layer 1 and 2:**
  - PHY - Generic name - Type: Parameters.
- **Primitives between layer 1 and the RRC entity:**
  - CPHY - Generic name - Type: Parameters.

NOTE: This is a logical description of the primitives and does not cover addressing aspects (e.g. Transport Channel ID, Physical Channel ID, start frame number or disconnect frame number).

10.1 Generic names of primitives between layers 1 and 2

The primitives between layer 1 and layer 2 are shown in table 7.

Table 7: Primitives between layer 1 and 2

Generic Name	Parameter			
	REQ	IND	RESP	CNF
PHY-Access	Transport Format subset (1), ASC selected for Transport Block Set to be transmitted (5)	Not Defined	Not Defined	access information (1)
PHY-Data	TFI, Transport Block Set, CFN_{CELL}, Paging Indicators (2), ASC selected for that Transport Block Set (3), HS-DSCH information (6)	TFI, Transport Block Set, CRC check result, TD (4), HARQ process (6)	Not Defined	Not Defined
PHY-CPCH_Status	Transport Format subset (1)	Not Defined	Not Defined	Transport Format subset (1)
PHY-Status	Not Defined, HARQ status	Event value, Feedback information (6)	Not Defined	Not Defined
NOTE (1): FDD only. NOTE (2): PCH only NOTE (3): 3.84 Mcps TDD RACH only NOTE (4): optional, TDD only NOTE (5): FDD and 1.28 Mcps TDD RACH only NOTE (6): HS-DSCH only				

10.1.1 PHY-Access-REQ

The PHY-Access-REQ primitive is used to request access to either a RACH or a CPCH transport channel from the physical layer. A PHY-Access primitive is submitted once before the actual data for peer-to-peer communication is passed to the physical layer using the PHY-Data primitive. This primitive is used in FDD and 1.28 Mcps TDD only.

Parameters:

- Transport Format subset.
- ASC selected for Transport Block Set to be transmitted (RACH only)

10.1.2 PHY-Access-CNF

The PHY-Access-CNF primitive is used to confirm that physical layer synchronisation has been established and that the physical layer is ready for data transmission using the PHY-Data primitive. This primitive is used in FDD and 1.28 Mcps TDD only.

Parameters:

- access information.

10.1.3 PHY-Data-REQ

The PHY-Data primitives are used to request SDUs used for communications passed to and from the physical layer. One PHY-Data primitive is submitted every Transmission Time Interval for each Transport Channel.

Parameters:

- TFI;
- Transport Block Set;
- CFN_{CELL};
- Page Indicators (PIs) (PCH only).

- HS-DSCH information (HS-DSCH information)
- ASC selected for that Transport Block Set (3.84 Mcps TDD RACH only)

10.1.4 PHY-Data-IND

The PHY-Data primitives are used to indicate SDUs used for Layer 2 passed to and from the physical layer. One PHY-Data primitive is submitted every Transmission Time Interval for each Transport Channel.

Parameters:

- TFI;
- Transport Block Set;
- CRC check result;
- TD (RX Timing Deviation measurement) (optional, TDD only).
- Process Id (HS-DSCH)

10.1.5 PHY-CPCH_Status-REQ

The PHY-CPCH_Status-REQ primitive is used by MAC to request CPCH status information that is broadcast on CSICH. The parameter Transport Format subset allows to restrict the CPCH status information request to a limited number of CPCH channels of the given CPCH set. This primitive is used in FDD only.

Parameters:

- Transport Format subset.

10.1.6 PHY-CPCH_Status-CNF

The PHY-CPCH_Status-CNF primitive is used by L1 to indicate CPCH status information that is broadcast on CSICH. Status information is represented in terms of a Transport format subset that is permitted to be employed by the UE. This primitive is used in FDD only.

Parameters:

- Transport Format subset

10.1.7 PHY-Status-IND

The PHY-Status-IND primitive can be used by the layer 1 to notify higher layers of an event that has occurred.

Parameters:

- Feedback information (HS-DSCH only)
- Event value:
  - CPCH Emergency stop was completed;
  - CPCH Start of Message Indicator was received;
  - CPCH Start of Message Indicator was not received;
  - L1 hardware failure has occurred.
  - CPCH End of Transmission was received

10.2 Generic names of primitives between layers 1 and 3

The status primitives between layer 1 and 3 are shown in table 8.

Table 8: Status primitives between layer 1 and 3

Generic Name	Parameter			
	REQ	IND	RESP	CNF
CPHY-Sync	Not Defined	CCTrCH ID (1)	Not Defined	Not Defined
CPHY-Out-of-Sync	Not Defined	CCTrCH ID (1)	Not Defined	Not Defined
CPHY-Measurement	transmission power threshold, measurement parameters	measurement parameters	Not Defined	Not Defined
CPHY-Error	Not Defined	error code	Not Defined	Not Defined
CPHY-CPCH-EOT	Not Defined	No Parameter (2)	Not Defined	Not Defined
NOTE (1): TDD only. NOTE (2): FDD only				

10.2.1 STATUS PRIMITIVES

10.2.1.1 CPHY-Sync-IND

This primitive is used for L1 to indicate to RRC that synchronisation of a certain physical channel has been done in the receiver. In FDD synchronisation is based on reception of the DPCCH, and in TDD synchronisation is based on Special Burst, TB reception, and burst quality estimation.

Parameters:

- CCTrCH ID (TDD only).

10.2.1.2 CPHY-Out-of-Sync-IND

Primitive sent from L1 to RRC indicating that synchronisation of a previously configured connection has been lost in the receiver. In FDD synchronisation is based on reception of the DPCCH, and in TDD synchronisation is based on Special Burst, TB reception, and burst quality estimation.

Parameters:

- CCTrCH ID (TDD only).

10.2.1.3 CPHY-Measurement-REQ

The Request primitive is used for RRC to configure L1 measurements.

Parameters:

- transmission power threshold;
- refer to clause 9 for measurement parameters.

10.2.1.4 CPHY-Measurement-IND

The Indication primitive is used to report the measurement results.

Parameters:

- refer to clause 9 for measurement parameters.

10.2.1.5 CPHY-Error-IND

The CPHY-Error primitive is used to indicate to the management entity that an error has occurred as a result of a physical layer fault.

Parameters:

- error code.

10.2.1.6 CPHY-CPCH-EOT-IND

The CPHY-CPCH-EOT-IND primitive is used by L1 to indicate RRC of an end of CPCH transmission event has occurred. This primitive is used in FDD only.

Parameters:

- No Parameter.

10.2.2 CONTROL PRIMITIVES

The control primitives between layer 1 and 3 are shown in table 9.

Table 9: Control primitives between layer 1 and 3

Generic Name	Parameter			
	REQ	IND	RESP	CNF
CPHY-TrCH-Config	transport channel description	Not Defined	Not Defined	No Parameter
CPHY-TrCH-Release	No Parameter	Not Defined	Not Defined	No Parameter
CPHY-RL-Setup	physical channel description	Not Defined	Not Defined	No Parameter
CPHY-RL-Release	No Parameter	Not Defined	Not Defined	No Parameter
CPHY-RL-Modify	physical channel description	Not Defined	Not Defined	No Parameter
CPHY-Commit	activation time	Not Defined	Not Defined	Not Defined
CPHY-CPCH-Estop	No Parameter (1)	No Parameter (1)	No Parameter (1)	No Parameter (1)
CPHY-Out-of-Sync-Config	Out of Sync detection parameters	Not Defined	Not Defined	No Parameter
NOTE (1): FDD only.				

10.2.2.1 CPHY-TrCH-Config-REQ

This primitive is used for setting up and configuring a transport channel, and also to modify an existing transport channel.

Parameters:

- transport channel description.

10.2.2.2 CPHY-TrCH-Config-CNF

This primitive is used for confirming the setting up and configuring a transport channel, and also modifying an existing transport channel.

Parameters:

- No Parameter.

10.2.2.3 CPHY-TrCH-Release-REQ

This primitive is used for releasing a transport channel.

Parameters:

- No Parameter.

10.2.2.4 CPHY-TrCH-Release-CNF

This primitive is used for confirming the releasing a transport channel.

Parameters:

- No Parameter.

10.2.2.5 CPHY-RL-Setup-REQ

The Request primitive is sent from RRC to L1 for establishment of a Radio link to a certain UE.

Parameters:

- physical channel description.

10.2.2.6 CPHY-RL-Setup-CNF

The Confirm primitive is returned from L1 to RRC when the Radio link is established. In case L1 is unable to execute the request, this is indicated in the confirm primitive.

Parameters:

- No Parameter.

10.2.2.7 CPHY-RL-Release-REQ

The Request primitive is sent from RRC to L1 for release of a Radio link to a certain UE.

Parameters:

- No Parameter.

10.2.2.8 CPHY-RL-Release-CNF

The Confirm primitive is returned from L1 to RRC when the radio link is released.

Parameters:

- No Parameter.

10.2.2.9 CPHY- RL-Modify-REQ

The Request primitive is sent from RRC to L1 for modification of a Radio link to a certain UE.

Parameters:

- physical channel description.

10.2.2.10 CPHY-RL-Modify-CNF

The Confirm primitive is returned from L1 to RRC when the radio link is modified. In case L1 is unable to execute the request, this is indicated in the confirm primitive.

Parameters:

- No Parameter.

10.2.2.11 CPHY-Commit-REQ

This primitive is sent from RRC to L1 to synchronise UE and NW for the physical channel modification.

Parameters:

- activation time.

10.2.2.12 CPHY-CPCH-Estop-IND

The CPHY-CPCH-Estop-IND primitive is used by L1 to notify RRC of a CPCH emergency stop message has been received. This primitive is used in FDD only.

Parameters:

- No Parameter.

10.2.2.13 CPHY-CPCH-Estop-RESP

This primitive is sent from UE RRC to L1 for emergency stop of the CPCH transmission. After receiving this primitive, UE L1 stopping its transmission on the related CPCH. This primitive is used in FDD only.

Parameters:

- No Parameter.

10.2.2.14 CPHY-CPCH-Estop-REQ

This primitive is sent from RRC to L1 for CPCH Emergency Stop. This primitive is sent for triggering of a CPCH emergency stop. After receiving this primitive, Node B L1 sends CPCH Estop Command to UE. This CPCH Estop Command is all 1 bits pattern in the CCC field of DL DPCCH for CPCH. This primitive is used in FDD only.

Parameters:

- No Parameter.

10.2.2.15 CPHY-CPCH-Estop-CNF

This primitive is sent from Node B L1 to RRC for confirming the emergency stop of the CPCH. This primitive is used in FDD only.

Parameters:

- No Parameter.

10.2.2.16 CPHY-Out-of-Sync-Config-REQ

This primitive is sent from RRC to Node B L1 to reconfigure the parameters to detect "in sync" and "out of sync" conditions of uplink physical channel transmission.

Parameters:

- Out of Sync detection parameters

10.2.2.17 CPHY-Out-of-Sync-Config-CNF

This primitive is sent from Node B L1 to RRC for confirming the Reconfiguration of the Out-of-Sync parameters on Node B L1.

Parameters:

- No Parameter.

10.3 Parameter definition

10.3.1 Error code

- Hardware failure.

10.3.2 Event value

- Maximum transmission power has been reached.
- Allowable transmission power has been reached.
- Average transmission power is below allowable transmission power.
- Loss of DL DPCCH.
- Completion of CPCH Emergency stop.
- CPCH Start of Message Indicator was received.
- CPCH Start of Message Indicator was not received.
- Maximum number of frames for CPCH transmission has been reached.
- End of Frame for CPCH transmission has been received.

10.3.3 Access Information

- Ready for RACH data transmission (in case of FDD mode: when Ack on AICH has been received, in case of 1.28 Mcps TDD: when Ack on FPACH has been received);
- timeout, no response on AICH (FDD only) or AP-AICH (FDD only) or FPACH (1.28 Mcps TDD only) has been received while maximum number of access preamble transmissions (FDD only) /synchronisation attempts (1.28 Mcps TDD only) has been performed.

The following values of this parameter apply to FDD only:

- NACK on AICH or AP-AICH has been received;
- ready for CPCH data transmission (CD or CD/CA information received on CD/CA-ICH);
- mismatch of CD/CA-ICH signatures;
- no response on CD/CA-ICH received;
- timeout, no CD/CA-ICH received.

10.3.4 Transport Format Subset

- A subset of the Transport Format set of a Transport Channel.

10.3.5 Physical channel description

10.3.5.1 Primary SCH

- Tx diversity mode.

10.3.5.2 Secondary SCH

- Tx diversity mode.

10.3.5.3 Primary CCPCH

- Frequency info.
- DL scrambling code.
- Tx diversity mode.
- Timeslot (TDD only).
- Burst type (3.84 Mcps TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).

10.3.5.4 Secondary CCPCH

- DL scrambling code.
- Channelisation code.
- Tx diversity mode.
- Timeslot (TDD only).
- Burst type (3.84 Mcps TDD only).
- Midamble shift (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).

10.3.5.5 PRACH

- Access Slot (FDD only).
- Preamble scrambling code (FDD only).
- Available preamble signatures (FDD only).
- Spreading factor for data part.
- Power control info:
  - UL target SIR;
  - primary CCPCH DL TX Power;
  - UL interference;
  - power offset (Power ramping) (FDD only).
- Access Service Class Information (PRACH Partitioning):

  - Available signatures for each ASC (FDD only).
  - Available Channelisation codes for each ASC (TDD only).
  - Available Subchannels for each ASC.
- AICH transmission timing parameter (FDD only).
- Timeslots (TDD only).
- Available Channelisation Codes (TDD only)
- Spreading Factor (TDD only).
- Midamble Type (TDD only).

10.3.5.6 Uplink DPDCH+DPCCH

- UL scrambling code.
- DPCCH slot structure (N_{pilot}, N_{TPC}, N_{TFCI}, N_{FBI}).
- Transmission Time offset value.

10.3.5.7 Uplink DPCH

- Timing Advance (TDD only).
- DPCH channelisation code (TDD only).
- Burst Type (3.84 Mcps TDD only).
- DPCH midamble shift (TDD only).
- Timeslot (TDD only).
- Offset (TDD only).
- Repetition Period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).

10.3.5.8 Downlink DPCH

- Transmission Time offset value.
- DL scrambling code:
  - DL Channelisation code.
- Tx diversity mode:
  - FB mode (FDD only).
- Slot structure ($N_{pilot,}$ N_{TPC}, N_{TFCI}, $N_{FBI,}$, N_{data1}, N_{data2}) (FDD only).
- Special slot structure only for CPCH ($N_{pilot,}$ N_{TPC}, N_{TFCI}, N_{CCC}) (FDD only)
- Burst Type (3.84 Mcps TDD only).
- DPCH midamble shift (TDD only).
- Timeslot (TDD only).
- Offset (TDD only).

- Repetition period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).

10.3.5.9 PCPCH (Physical Common Packet Channel)

- CPCH Set ID to which this PCPCH belongs.
- Parameters related to the AP preamble:
    - Access Preamble (AP) scrambling code;
    - available AP signatures/subchannels for access request;
- Parameters related to the CD preamble:
    - CD preamble scrambling code;
    - available CD signatures/subchannels;
- Parameters related to PCPCH message part:
    - PCPCH scrambling code;
    - PCPCH Channelisation code;
    - data rate (spreading factor);
    - N_frames_max: Maximum length of CPCH message in radio frames.

10.3.5.10 PICH

- Scrambling code.
- Channelisation code.
- Timeslot (TDD only).
- Burst Type (3.84 Mcps TDD only).
- Midamble shift (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).

10.3.5.11 AICH

- Scrambling code.
- Channelisation code.
- Tx diversity mode.

NOTE: The value for the parameters needs to be consistent with the corresponding PRACH.

10.3.5.12 AP-AICH

- CPCH Set ID.
- Scrambling code.

- Channelisation code.
- Tx diversity mode.

10.3.5.13 CD-ICH

- CPCH Set ID.
- Scrambling code.
- Channelisation code.
- Tx diversity mode.

NOTE: This physical channel is used in conjunction with PCPCH when UE Channel Selection is active.

10.3.5.14 CD/CA-ICH

- CPCH Set ID.
- Scrambling code.
- Channelisation code.
- Tx diversity mode.

NOTE: This physical channel is used in conjunction with PCPCH when Channel Assignment is active.

10.3.5.15 CSICH

- CPCH Set ID.
- Scrambling code.
- Channelisation code.
- Tx diversity mode.

NOTE: The values for the parameters need to be consistent with the AP-AICH that is time-multiplexed with this CSICH.

10.3.5.16 PDSCH

- Scrambling code.
- Channelisation code.
- Tx diversity mode:
    - FB mode (FDD only).
- DL channelisation code (TDD only).
- Burst Type (3.84 Mcps TDD only).
- PDSCH Midamble shift (TDD only).
- Timeslot (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).

10.3.5.17 PUSCH

- PUSCH channelisation code.
- Burst Type (3.84 Mcps TDD only).
- PUSCH midamble shift (TDD only).
- Timeslot (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).
- Timing Advance (TDD only).

10.3.5.18 DwPCH (1.28 Mcps TDD only)

- Tx diversity mode.
- SYNC_DL code ID.

10.3.5.19 UpPCH (1.28 Mcps TDD only)

- SYNC_UL code ID.

10.3.5.20 FPACH (1.28 Mcps TDD only)

- Scrambling code
- Channelisation code
- Timeslot
- Midamble shift
- Tx diversity mode.

10.3.5.21 PNBSCH (Physical Node B Synchronisation channel)

- Node B - Node B over the air communication.
- Only for TDD cells.
- Repetition period.
- **C**oncatenated periodically **E**xtended **C**omplementary sequences.

10.3.5.22 HS-SCCH

- Scrambling code
- Channelisation code
- Timeslot (TDD only)
- Burst type (3.84 Mcps TDD only)

10.3.5.23 HS-SICH (TDD only)

- Channelisation code.

- Burst Type 1 (3.84 Mcps TDD only).

- Midamble shift

- Timeslot

10.3.6 Feedback information

- Quality indication

- HARQ Status

10.3.7 HARQ process

- Process Id

10.3.8 HS-DSCH information

- Modulation scheme

- Channelisation code

- Timeslot (TDD only)

- Redundancy version/Constellation

- Process Id

10.3.9 HARQ status

- HARQ acknowledgement (acknowledgement or negative acknowledgement)

11 Transport block transmission

Data exchange between MAC and the physical layer, is defined in terms of Transport Block Sets (TBS). On a Transport Channel, one Transport Block Set can be transmitted for every Transmission Time Interval. A TBS consists of one or several Transport Blocks which shall be numbered 1,…, m,… ,M and is delivered in the order of the index m. A Transport Block is identical with a MAC PDU. A Transport Block (MAC PDU) is a bit string ordered from first to last, where the first and last bits are numbered 1 and A, respectively, where A is the number of bits of the Transport Block. In case of Transport Block size=0 bit, only parity bits are sent and A=0.

The bits of the mth Transport Block in a TBS, are denoted as a_{im1}, …, a_{imA} for a Transport Channel identified by an index i (cf. [3] and [4]).

Annex A (normative):
Description of Transport Formats

The following table describes the characterisation of a Transport Format.

Table A.1: Characterisation of Transport Format

		Attribute values	**BCH**	**PCH**	**FACH**	**RACH**
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	246	1 to 5000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	246	1 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms				
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	20 ms	10ms for FDD, 20ms for TDD	10, 20 ms, 40 and 80 ms	10 ms and 20 ms for FDD, 10 ms for 3.84 Mcps TDD 5ms, 10ms and 20ms for 1.28 Mcps TDD
	Type of channel coding	No Coding Turbo coding Convolutional coding	Convolutional coding	Convolutional coding	No coding Turbo coding Convolutional coding	Convolutional coding
	Code rates	1/2, 1/3	1/2 for FDD and 3.84 Mcps TDD 1/3 for 1.28 Mcps TDD	1/2 for FDD and 3.84 Mcps TDD 1/2, 1/3 for 1.28 Mcps TDD	1/2, 1/3	1/2
	CRC size	0, 8, 12, 16, 24	16	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

		Attribute values	CPCH	DCH	DSCH	USCH
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms		10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
	Type of channel coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding
	code rates (in case of convolutional coding)	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3
	CRC size	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

		HS-DSCH
Dynamic part	Transport Block Size	1 to 200 000 8 bit granularity
	Transport Block Set Size	1 to 200 000 8 bit granularity
	Modulation scheme	QPSK, 16 QAM
	Redundancy version/Constellation	1 to 8
Static part	Transmission Time Interval	2ms for FDD 5 ms for 1.28 Mcps TDD 10 ms for 3.84 Mcps TDD
	Type of channel coding	Turbo coding
	Code rates	1/3
	CRC size	24

NOTE 1: The maximum size of the Transport Block has been chosen so as to avoid any need for segmentation in the physical layer into sub-blocks (segmentation should be avoided in the physical layer).

NOTE 2: Code rate is fixed to 1/3 in case of Turbo coding.

NOTE 3: All channels using the same resources as the BCH (i.e. the same timeslot and code, e.g. in a multiframe pattern) have to use different Transport Formats than the BCH to allow the identification of the BCH channel by physical layer parameters. Due to the differing parameters, decoding of other transport channels than BCH will result in an erroneous CRC.

Annex B (informative): Example of Transport format attributes for AMR speech codec

The support for the AMR speech codec is exemplified below. On the radio interface, one Transport Channel is established per class of bits i.e. DCH A for class A, DCH B for class B and DCH C for class C. Each DCH has a different transport format combination set which corresponds to the necessary protection for the corresponding class of bits as well as the size of these class of bits for the various AMR codec modes.

With this principle, the AMR codec mode which is used during a given TTI can be deduced from the format of the transport channels DCH A, DCH B and DCH C for that particular TTI.

Note that a similar principle can also be applied for other source codecs e.g. other speech codecs or video codecs.

An example of transport channel description for each class of bits is given in table B.1.

Table B.1

	Attribute	**Value**		
		Class A	**Class B**	**Class C**
Dynamic part	Transport Block Size	81 65 75 61 58 55 49 42 39	103 99 84 87 76 63 54 53 0	60 40 0 0 0 0 0 0 0
	Transport Block Set Size	Same as the transport block sizes		
Semi-static part	Transmission Time Interval	20 ms		
	Type of channel coding	Convolutional coding		
	code rates	1/2, 1/3 + class-specific rate matching	None, 1/2, 1/3 + class-specific rate matching	None, 1/2 , 1/3 + class-specific rate matching
	CRC size	8	0	0
	Resulting ratio after static rate matching	0.5 to 4(with no coding the rate matching ratio needs to be >1)		

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
08/1999	RP-04	RP-99309	-		Approved after TSG-RAN #4 and TSG-RAN WG2 #6 (08/1999) by correspondence and placed under Change Control	-	3.0.0
10/1999	RP-05	RP-99461	001		Making all transport block equally sized within a transport block set	3.0.0	3.1.0
	RP-05	RP-99461	002	1	UE Simultaneous Physical Channel Combinations in TDD Mode	3.0.0	3.1.0
	RP-05	RP-99461	004		Timing advance (TDD only)	3.0.0	3.1.0
	RP-05	RP-99461	005		Measurements for TDD provided by physical layer	3.0.0	3.1.0
	RP-05	RP-99461	006		Change of the Downlink model of the UE in relation to PCH	3.0.0	3.1.0
	RP-05	RP-99461	007		Physical channel description for TDD	3.0.0	3.1.0
	RP-05	RP-99461	008		Attributes of the semi-static part and coding terminology	3.0.0	3.1.0
	RP-05	RP-99461	009		Editorial changes following LS received from WG1	3.0.0	3.1.0
	RP-05	RP-99461	010		Support of Uplink Synchronization Feature in UL channels (TDD only)	3.0.0	3.1.0
	RP-05	RP-99461	011		Simultaneous reception of AICH and S-CCPCH	3.0.0	3.1.0
	RP-05	RP-99461	012		Removal of Measurement Precision Requirements	3.0.0	3.1.0
	RP-05	RP-99461	013		Compressed mode	3.0.0	3.1.0
	RP-05	RP-99461	014		Change of the model of the UE with respect to shared channel multiplexing	3.0.0	3.1.0
12/1999	RP-06	RP-99624	015		Alignment of measurement names with RAN	3.1.0	3.2.0
	RP-06	RP-99623	018		Compressed Mode description	3.1.0	3.2.0
	RP-06	RP-99624	022		Alignment with TDD layer 1	3.1.0	3.2.0
	RP-06	RP-99624	023	1	Physical Channel Parameters	3.1.0	3.2.0
	RP-06	RP-99624	025		Addition of PICH and Corrections for Primary	3.1.0	3.2.0
	RP-06	RP-99624	026		Removal of compressed mode inband signalling	3.1.0	3.2.0
	RP-06	RP-99624	028	1	Measurement of Transmitted carrier power	3.1.0	3.2.0
	RP-06	RP-99623	030	1	Editorial issues	3.1.0	3.2.0
	RP-06	RP-99624	031		Measurement of Physical Channel BER	3.1.0	3.2.0
01/2000	-	-	-		E-mail approval by TSG-RAN WG2 of different implementation of CR 015 and CR 028 according to authors' intentions	3.2.0	3.3.0
03/2000	RP-07	RP-000035	032	2	Revision of CPCH model	3.3.0	3.4.0
	RP-07	RP-000035	033	1	Error Correction Coding for FACH	3.3.0	3.4.0
	RP-07	RP-000035	034	3	Revision of compressed mode description	3.3.0	3.4.0
	RP-07	RP-000035	036		TrBLK size	3.3.0	3.4.0
	RP-07	RP-000035	037		PDSCH multi-code	3.3.0	3.4.0
	RP-07	RP-000035	038	1	Primitives for CPCH Abnormal Situation Handling	3.3.0	3.4.0
	RP-07	RP-000035	039		Physical channel BER	3.3.0	3.4.0
	RP-07	RP-000035	041		Editorial modification on AMR trblk size	3.3.0	3.4.0
	RP-07	RP-000035	042	1	Corrections and clarifications on L1 and L2 functionality descriptions	3.3.0	3.4.0
	RP-07	RP-000035	043	1	Transport Block Transmission	3.3.0	3.4.0
	RP-07	RP-000035	044		Clarification to layer 1 model regarding transport blocks received by UE with CRC failure	3.3.0	3.4.0
	RP-07	RP-000035	045		Removal of SCH and SCCH	3.3.0	3.4.0
	RP-07	RP-000035	046		Replacement of Time of Arrival Measurement by RTT	3.3.0	3.4.0
	RP-07	RP-000035	047	1	Incorporation of Measurement filtering model	3.3.0	3.4.0
	RP-07	RP-000035	048		Separation of physical channel BER measurements	3.3.0	3.4.0
06/2000	RP-08	RP-000215	049	1	Maximum number of simultaneous compressed mode pattern sequences per measurement purpose	3.4.0	3.5.0
	RP-08	RP-000215	050	1	Removal of CPICH SIR measurement quantity	3.4.0	3.5.0
	RP-08	RP-000215	051		Measurements	3.4.0	3.5.0
	RP-08	RP-000215	052	1	End of CPCH transmission	3.4.0	3.5.0
	RP-08	RP-000215	053	1	Measurements of RACH and CPCH	3.4.0	3.5.0
	RP-08	RP-000215	056		Editorial modification on Transport Block Size	3.4.0	3.5.0
	RP-08	RP-000215	057	3	CPCH correction	3.4.0	3.5.0
	RP-08	RP-000215	058	1	SFN Transmission Rate and the Need to Maintain CFN in TDD Mode	3.4.0	3.5.0
	RP-08	RP-000215	059		Addition of out-of-sync-configuration control primitives	3.4.0	3.5.0
	RP-08	RP-000215	060		Addition of propagation delay measurement	3.4.0	3.5.0
	RP-08	RP-000215	061	2	Layer 1 LCS measurements	3.4.0	3.5.0
	RP-08	RP-000215	062	1	Refinement of the definition of a Transport Block	3.4.0	3.5.0
	RP-08	RP-000215	063	1	Corrections of CPCH Emergency stop and start of message Indicator	3.4.0	3.5.0
	RP-08	RP-000215	064		BLER	3.4.0	3.5.0
09/2000	RP-09	RP-000353	065		Filtering period in case of periodical reporting	3.5.0	3.6.0
	RP-09	RP-000353	066		UE simultaneous Physical and Transport channel combinations for	3.5.0	3.6.0

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
					PDSCH and DSCH		
	RP-09	RP-000353	067		Inclusion of SIR ERROR measurement	3.5.0	3.6.0
	RP-09	RP-000353	068	1	Simultaneous reception of PCCPCH and SCCPCH	3.5.0	3.6.0
	RP-09	RP-000353	070		Removal of puncturing limit from the transport format definition	3.5.0	3.6.0
	RP-09	RP-000353	071		Clarification of the Timeslot ISCP Measurements	3.5.0	3.6.0
12/2000	RP-10	RP-000563	072		RACH model	3.6.0	3.7.0
	RP-10	RP-000563	073		Clarification of UTRAN SIR measurement	3.6.0	3.7.0
	RP-10	RP-000563	074		Removal of compressed mode measurement purpose "other"	3.6.0	3.7.0
	RP-10	RP-000563	075		Removal of compressed mode measurement purpose "GSM"	3.6.0	3.7.0
	RP-10	RP-000563	076		Removal of physical channel BER measurement for TDD	3.6.0	3.7.0
	RP-10	RP-000563	077		CPCH model correction	3.6.0	3.7.0
	RP-10	RP-000563	078	1	Removal of FAUSCH and ODMA	3.6.0	3.7.0
	RP-10	RP-000563	080	2	Correction to transport channel mapping	3.6.0	3.7.0
	RP-10	RP-000563	081		Alignment of measurement reference description	3.6.0	3.7.0
	RP-10	RP-000563	082		Changing the name of "RSSI" to "Received total wide band power"	3.6.0	3.7.0
03/2001	RP-11	RP-010020	084	2	Additional physical channel combination for FDD downlink to allow COUNT-C-SFN difference measurement	3.7.0	3.8.0
	RP-11	RP-010020	087		In & Out of Sync Indications per CCTrCH in TDD	3.7.0	3.8.0
	RP-11	RP-010020	088		Correction & Clarification to TDD RACH Model and Primitives	3.7.0	3.8.0
	RP-11	RP-010020	089	1	Alignment of measurements provided by the physical layer	3.7.0	3.8.0
	RP-11	RP-010020	092	1	Physical channel combinations in TDD	3.7.0	3.8.0
	RP-11	RP-010020	094		Measurement model clarifications	3.7.0	3.8.0
	RP-11	RP-010020	095		Removal of DPCCH Gating from Release 99	3.7.0	3.8.0
	RP-11	RP-010020	096	1	Clarification of simultaneous operation of DRAC and CTCH	3.7.0	3.8.0
	RP-11	RP-010037	090	2	1.28 Mcps TDD	3.8.0	4.0.0
	RP-11	RP-010041	093	1	Measurements for Node B synchronisation	3.8.0	4.0.0
06/2001	RP-12	RP-010303	100		Physical Channel Combination	4.0.0	4.1.0
	RP-12	RP-010303	102		General corrections and clarifications	4.0.0	4.1.0
	RP-12	RP-010303	105		Definition of empty TF and TFC	4.0.0	4.1.0
	RP-12	RP-010320	106		Timing Advance (TADV) for 1.28 Mcps TDD	4.0.0	4.1.0
09/2001	RP-13	RP-010537	098		Transmission of selected ASC to physical layer	4.1.0	4.2.0
	RP-13	RP-010537	108		Corrected definition of the CCTrCH concerning BCH, RACH and CPCH	4.1.0	4.2.0
	RP-13	RP-010537	110		Transport Format Set Annex Correction	4.1.0	4.2.0
	RP-13	RP-010537	112		Corrections on un-supported features	4.1.0	4.2.0