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Technical Specification

**3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG) RAN
UTRAN Iu Interface RANAP Signalling**

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Intellectual Property Rights

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project, Technical Specification Group <TSG name>.

The contents of this TS may be subject to continuing work within the 3GPP and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version m.t.e

where:

- m indicates [major version number]
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated into the specification.

4 Scope

The present document ...

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] UMTS 25.931, UTRAN Functions, Examples on Signalling Procedures

[2] [UMTS 25.401, UTRAN Overall Description](#)

3 Definitions, symbols and abbreviations

3.1 Definitions

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

<defined term>: <definition>.

Example: text used to clarify abstract rules by applying them literally.

3.2 Symbols

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

<symbol> <Explanation>

3.3 Abbreviations

AAL2	ATM Adaptation Layer type 2
<u>AS</u>	<u>Access Stratum</u>
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
CN	Core Network
CRNC	Controlling RNC
CS	Circuit Switched
DRNC	Drift RNC
DRNS	Drift RNS
MSC	Mobile services Switching Center
<u>NAS</u>	<u>Non Access Stratum</u>
PDU	Protocol Data Unit
PS	Packet Switched
QoS	Quality of Service
RAB	Radio Access Bearer
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RANAP	Radio Access Network Application Part
SCCP	Signalling Connection Control Part
SGSN	Serving GPRS Support Node
SRNC	Serving RNC
SRNS	Serving RNS
UE	User Equipment
UTRAN	UMTS Terrestrial Radio Access Network

4 General

[Editor's note: This chapter should describe requirements on RANAP forward/backward compatibility, error handling principles, message coding principles etc.]

5 RANAP Services

[Editor's note: This chapter should describe services of RANAP protocol.]

The RANAP offers the following services:

6 Services expected from signalling transport

[Editor's note: This chapter should describe expected services from signalling transport.]

7 Functions of RANAP

[Editor's note: This chapter should describe functions of RANAP protocol.]

8 RANAP procedures

Elementary Procedures

Definition of Elementary Procedure

The RANAP protocol consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between the RNS and the CN.

An EP consists of an initiating message and possibly a response message.

Two kinds of EPs are used:

- Class 1: Elementary Procedures with response (success or failure).
- Class 2: Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.
- An EP is performed as a response to the first EP.

Unsuccessful

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e. absence of expected response).

Class 2 EPs are considered always successful.

Interaction between Elementary Procedures

The following applies concerning interaction between Elementary Procedures:

- The RESET procedure can interact with all EPs.
- The IU RELEASE procedure can interact with all EPs except the RESET procedure.

List of Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs:

Class 1

<u>Elementary Procedure</u>	<u>Successful Outcome</u>		<u>Unsuccessful Outcome</u>	
	<u>Response message</u>	<u>EP</u>	<u>Response message</u>	<u>Timer</u>
<u>RELOCATION PREPARATION</u>	<u>RELOCATION COMMAND</u>		<u>RELOCATION PREPARATION FAILURE</u>	
<u>RELOCATION RESOURCE ALLOCATION</u>	<u>RELOCATION REQUEST ACKNOWLEDGE</u>		<u>RELOCATION FAILURE</u>	
<u>RELOCATION CANCEL</u>	<u>RELOCATION CANCEL ACKNOWLEDGE</u>			
<u>RAB RELEASE REQUEST</u>		<u>RAB ASSIGNMENT</u>		
<u>RAB ASSIGNMENT</u>	<u>RAB ASSIGNMENT RESPONSE</u>		<u>RAB ASSIGNMENT FAILURE</u>	
<u>IU RELEASE REQUEST</u>		<u>IU RELEASE</u>		
<u>IU RELEASE</u>	<u>IU RELEASE COMPLETE</u>			
<u>RESET</u>	<u>RESET ACKNOWLEDGE</u>			
<u>CIPHER MODE CONTROL</u>	<u>CIPHER MODE COMPLETE</u>		<u>CIPHER MODE REJECT</u>	
<u>CN INFORMATION BROADCAST</u>	<u>CN INFORMATION BROADCAST CONFIRM</u>		<u>CN INFORMATION BROADCAST REJECT</u>	

Class 2

<u>Elementary Procedure</u>
<u>RELOCATION DETECT</u>
<u>RELOCATION COMPLETE</u>
<u>QUEUING INDICATION</u>
<u>OVERLOAD</u>
<u>COMMON ID</u>
<u>PAGING</u>
<u>TRACE INVOCATION</u>
<u>DIRECT TRANSFER</u>
<u>INITIAL UE MESSAGE</u>
<u>LOCATION REPORTING CONTROL</u>
<u>LOCATION REPORT</u>
<u>ERROR INDICATION</u>

8.1 Relocation**8.1.1 General**

Note 1: The impact of handover from GPRS to UMTS on Relocation procedure shall be studied.

Note 2: The reason for initiating the procedure has to be included (an air interface handover or SRNS relocation).

Relocation is used to relocate the serving RNS functionality from one RNS to an other. Procedure may or must not involve change of the radio resources assigned for the corresponding UE. This procedure can be used within one UTRAN if the Iur interface can not (or is not desired to) be used for active set management, between two UTRANs or at UTRAN side in handovers between two Radio Access systems (e.g. UMTS to GSM).

Relocation is carried over Iu interface, by the RANAP protocol.

[Editor's note: The following clarification is proposed by the Editor:]

Relocation procedure consists of the following elementary procedures: Relocation preparation, Relocation Resource Allocation, Relocation Detect, Relocation Complete and Relocation Cancel (if needed). These elementary procedures are described in subsections below.

All RANAP messages concerned with relocation are sent using the connection oriented mode of the signalling connection.

8.1.2 Relocation Preparation**8.1.2.1 Successful operation**

Procedure is initiated by the Serving RNC by sending a RELOCATION REQUIRED message to active CN nodes. Timer T(RELOCATION COMMAND) is started, upon transmitting the message. RELOCATION REQUIRED message allows a RNC to request that a relocation is to be carried out for a particular UE, having signalling connection via the serving RNC.

As a response to the RELOCATION REQUIRED message the CN sends RELOCATION COMMAND to the source RNC.

Upon reception of RELOCATION COMMAND belonging to ongoing procedure the RNC resets the timer T(RELOCATION COMMAND). Depending on the case the source RNC either triggers the handover procedure in the air interface or commits the execution of the relocation in the target system.

The signalling flow between the source RNC and the CN is shown in ~~Figure 1~~ ~~Figure 1~~ ~~Figure 2~~.

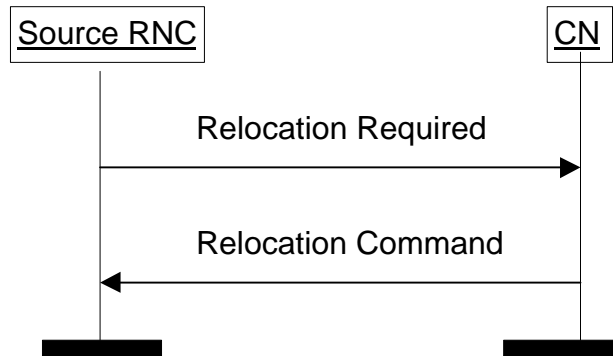


Figure 142. Relocation Preparation procedure between source RNC and CN.

Unsuccessful operation

If a failure occurs during the Relocation preparation procedure in the CN, the CN sends RELOCATION PREPARATION FAILURE message to the source RNC.

The signalling flow for this case is shown in Figure 3 ~~Figure 2~~.

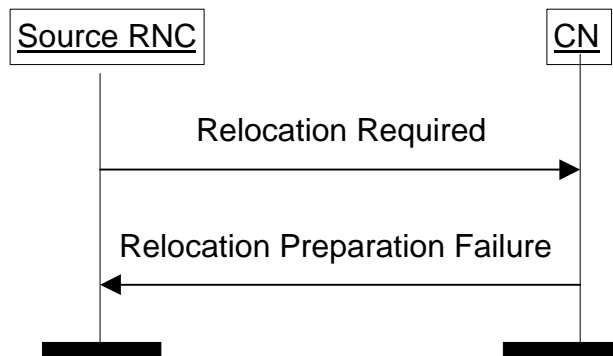


Figure 32. Relocation preparation failure.

8.1.3 Relocation resource allocation

Successful operation

The CN node sends a RELOCATION REQUEST message to the target RNC (selected by the source RNC and indicated in the RELOCATION REQUIRED message). This message contains details of the resource(s) required like bearer identifier and binding ID of each bearer to be established to the new Iu interface.

On receipt of this message the target RNC shall check availability of requested resources.

If all necessary resource(s) including the User plane setup are successfully allocated the target RNC sends back to the CN a RELOCATION REQUEST ACKNOWLEDGE message. The RELOCATION REQUEST ACKNOWLEDGE message sent by the target RNC may optionally contain a transparent field, which is transferred by the CN node to the source RNC using the RANAP message RELOCATION COMMAND.

To ensure the necessary load sharing on the Iu-PS interface,

- When the CN sends RELOCATION REQUEST for all Radio Access Bearers (associated with PDP contexts) of an UE, the CN specifies the IP address of the packet processing function allocated to this / each of these PDP context(s) in the CN.
- In the response to the CN request, i.e. in RELOCATION REQUEST ACKNOWLEDGE, the RNC specifies the IP address of the packet processing function allocated to this / each of these Radio Access Bearer(s) in the RNC.

[Figure 5](#) ~~Figure 3~~ [Figure 3](#) shows the signalling flow for Relocation resource allocation.

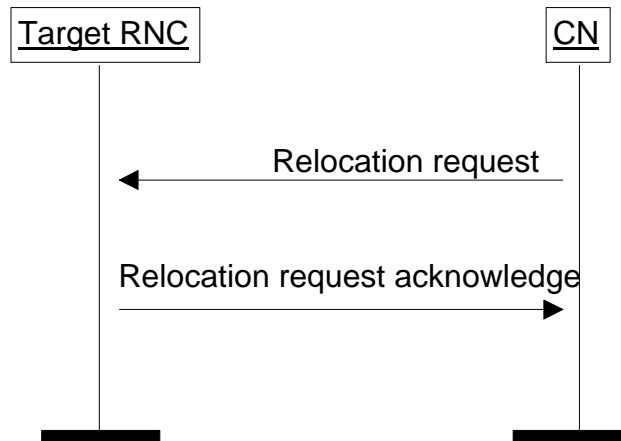


Figure 5 ~~3~~. Resource allocation for relocation.

Unsuccessful operation

If a failure occurs during the Relocation resource allocation procedure in the target RNC, the target RNC sends RELOCATION FAILURE message to the CN.

The signalling flow for this case is shown in [Figure 7](#) ~~Figure 5~~.

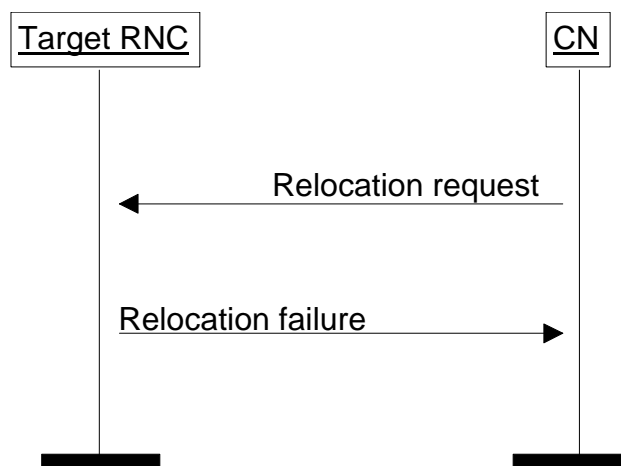


Figure 7 ~~5~~. Relocation resource allocation failure.

8.1.4 Relocation Detect

When the relocation execution trigger is received, the target RNC sends a RELOCATION DETECT message to the active CN nodes and start to act as an SRNC.

The signalling flow for Relocation detect procedure is shown in [Figure 9](#)[Figure 6](#)[Figure 5](#).

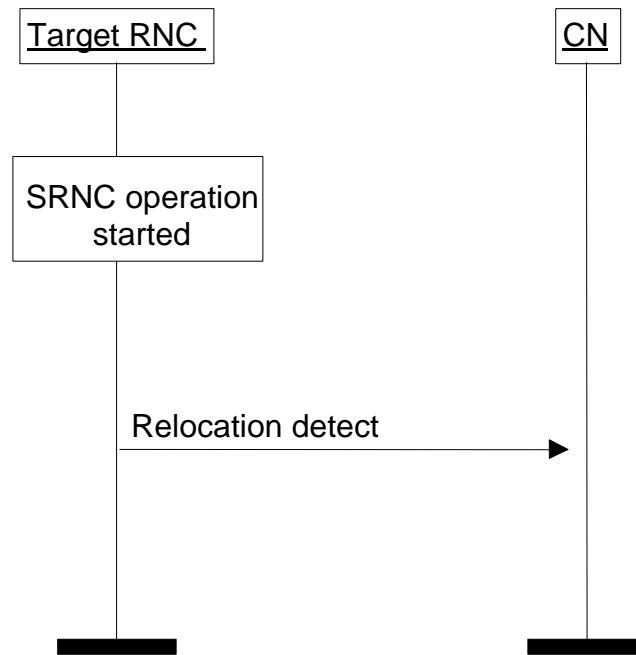


Figure [965](#). Relocation Detect procedure.

8.4.5 Relocation Complete

When the UE is successfully in communication with the target RNC, i.e. the new UTRAN identifiers are successfully exchanged with the UE, then the target RNC shall send a RANAP message RELOCATION COMPLETE to the CN nodes and terminate the procedure.

The signalling flow for Relocation complete procedure is illustrated in [Figure 11](#)[Figure 7](#)[Figure 6](#).

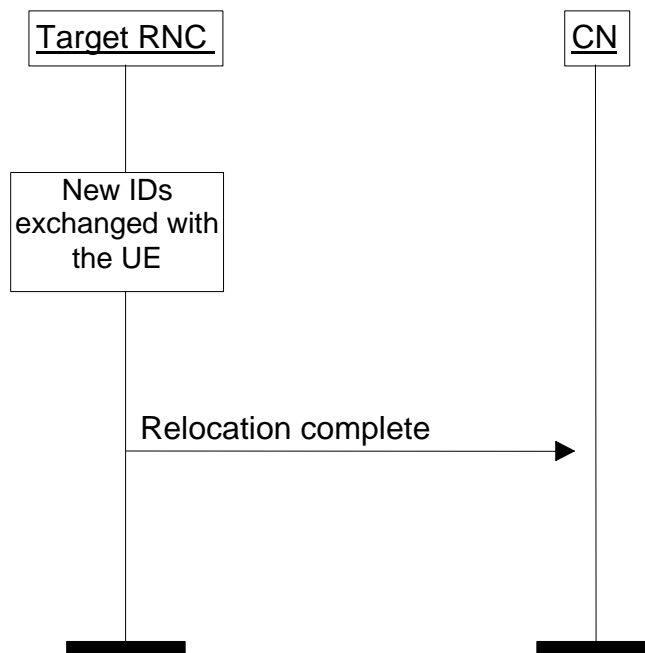


Figure [1176](#). Relocation Complete procedure.

The CN elements shall release all resources associated to the Source RNS.

Relocation Cancel

When the source RNC has decided to cancel the relocation, it sends RELOCATION CANCEL message to the CN. If the CN receives RELOCATION CANCEL message, the CN terminates the ongoing Relocation preparation procedure (if any) and sends RELOCATION CANCEL ACKNOWLEDGE message to the source RNC.

The signalling flow for Relocation Cancel procedure is shown in Figure 13~~Figure 8.~~

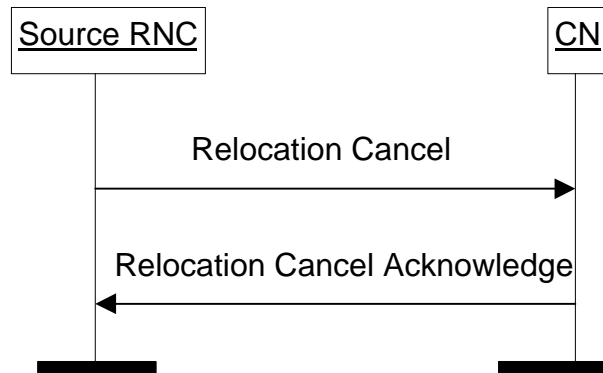


Figure 138. Relocation Cancel procedure.

8.1.6 Source RNC synchronisation

[Editor's note: Text to be added.]

8.1.7 Target RNC synchronisation

[Editor's note: Text to be added.]

8.2 Radio Access Bearer Assignment

[Editor's note: ~~Study item Iu/5 has been solved. The combined Radio Access Bearer Assignment procedure will be used.~~]

[Editor's note: It was agreed in RAN WG3 meeting #5 that text in RAB Assignment section will be rewritten. RAB Release Request and Queueing Indication messages will be extracted from RAB Assignment to separate elementary procedures. Also a description on when the User plane setup takes place will be added to the new text (it was removed from the figures).]

This procedure is triggered from the CN side and is used to modifying the list of bearers established between the requesting CN element and a given MS for which a RRC connection exists with the requesting CN element prior the running of the procedure.

The procedure is started by the CN sending a RANAP RADIO ACCESS BEARER ASSIGNMENT REQUEST message. Such a message contains the information needed for the UTRAN to decide the new bearer configuration to build. This comprises :

- The list of the bearers to establish if possible, with their description and a identity;
- Bearer linking, building group of bearers which must be either all established, or all rejected ;
- The list of the identities of the bearers to release ;

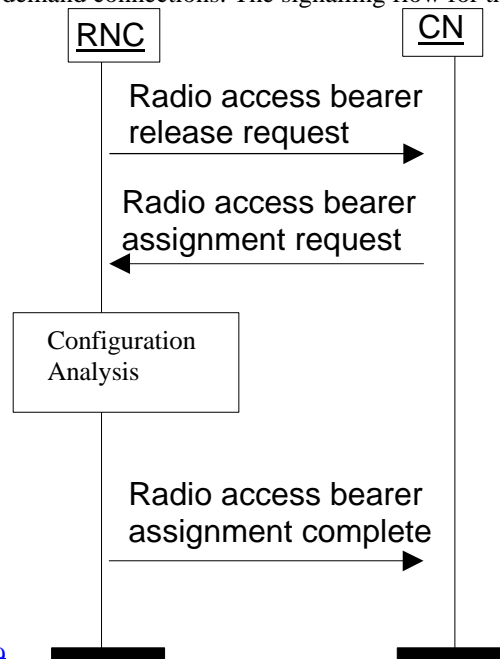
Each list may be empty. The bearers are only those related to RRC connection, i.e., used between the concerned MS and the requesting CN element. This excludes bearers set with other MS or with other CN elements.

For each bearer to establish, the following information is provided :

- An identity (bearer identity), used for eventual reference ;

- The characteristics of the MS-CN bearer, including such aspects as data rates, transmission quality of service, ..Some of them may include negotiable values.
- Priority level and pre-emption indication ;
- User plane mode of operation:
- Possibly a bit string to be passed to the upper layer on the UE side together with the bearer establishment indication.
- Binding Id used for associating the bearer identity and the corresponding User plane. The details of using the Binding Id are [described in \[2\]FFS](#).

For each bearer to be released, only the bearer identity is provided. If a radio channel release is required because of a UTRAN generated reason (e.g. O and M intervention,"equipment failure,"**"RAB pre-empted"** or if transmission from the UE is lost) then, the RNC shall generate a RADIO ACCESS BEARER RELEASE REQUEST message towards the CN. This message shall include a Cause Information Element, indicating the reason for the failure. On receipt of a RADIO ACCESS BEARER RELEASE REQUEST the CN shall initiate the release, as defined above, by sending a RANAP RADIO ACCESS BEARER ASSIGNMENT REQUEST message. On receipt of this message the UTRAN shall, if the resources are not already internally released, release the resources in the normal way. The procedure is always terminated with a RANAP RADIO ACCESS BEARER ASSIGNMENT **COMPLETE**RESPONSE to the CN. This procedure handles both pre-configured and by-demand connections. The signalling flow for this procedure has



been illustrated in [Figure 15](#)~~Figure 9~~

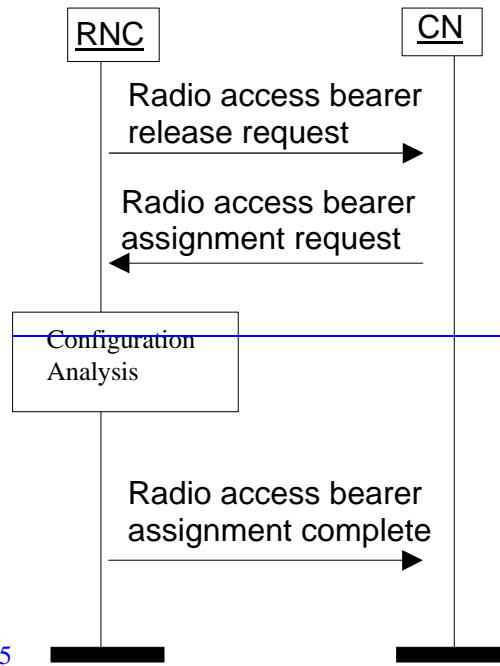
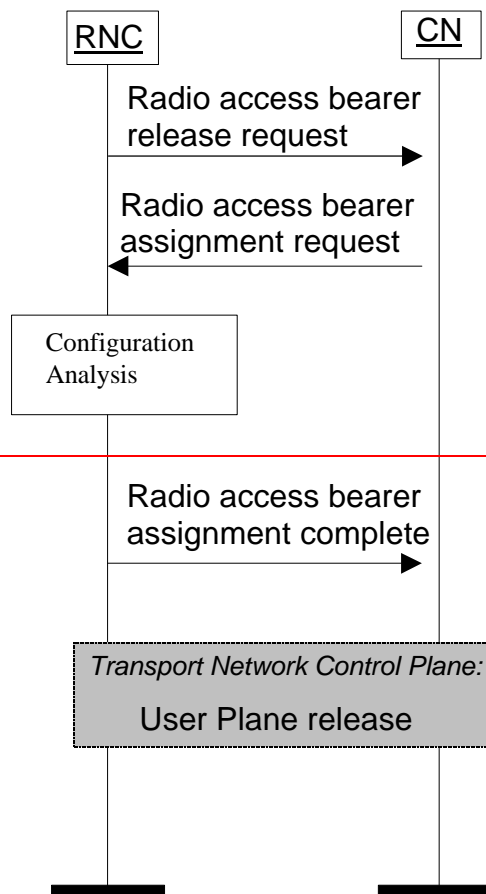


Figure 15

Figure 9 Figure 7.



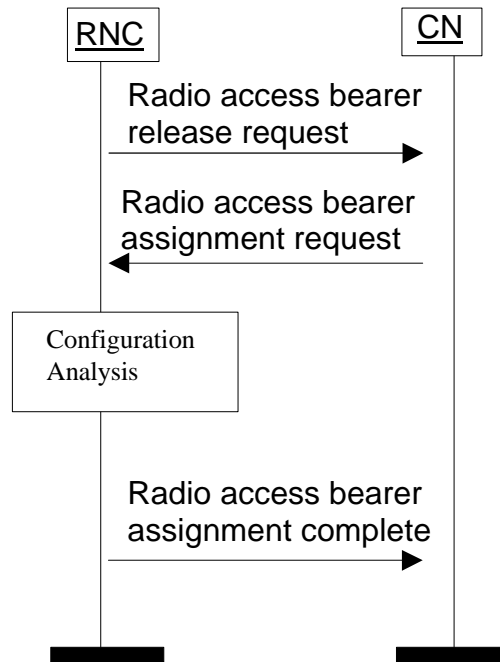


Figure 1597. Radio Access Bearer Assignment procedure, UTRAN generated release.

On the basis of the information provided, of the **UEMS** capabilities, of the information pertaining to all bearers already established with the **UEMS** (in particular the priority level and pre-emption indication), the UTRAN decides on the new **UEMS**-UTRAN bearer configuration, and starts the **RNC-UEAN-MS** procedures to set this configuration, and, when applicable, the procedures to establish and release local **RNC-CNAN-CN** bearers. The algorithm applied to reach the decision is outside the scope of this protocol specification.

The UTRAN shall report to the different CN elements the changes of configuration when effective, or when put in queue. This can be done in one or several messages, depending on the case, and on UTRAN choices.

A RANAP RADIO ACCESS BEARER ASSIGNMENT **COMPLETERESPONSE** message is sent to the requesting CN element when the whole request has been dealt with effectively. Such a message contains part or whole of the following information :

- The list of the bearer identities for the bearer successfully established or modified, if not already indicated ; with each bearer identity is provided the negotiable parameters as chosen by the UTRAN and the Binding Id used for associating the bearer identity and the corresponding User plane. The details of using the Binding Id are FFS.
- The list of the bearers which have been released, with for each a cause, if not already indicated.
- Localisation data, when the **RNCAN** got more information on where is the **UEMS** while running the procedure.

The sending and the reception of this message ends the procedure between the UTRAN and the requesting CN element.

To ensure the necessary load sharing on the Iu-PS interface,

- When the CN sends RAB ASSIGNMENT REQUEST for all Radio Access Bearers (associated with PDP contexts) of an UE, the CN specifies the IP address of the packet processing function allocated to this / each of these PDP context(s) in the CN.
- In the response to the CN request, i.e. in RAB ASSIGNMENT **COMPLETERESPONSE**, the RNC specifies the IP address of the packet processing function allocated to this / each of these Radio Access Bearer(s) in the RNC.

When at least one requested bearer has not been established, a RANAP RADIO ACCESS BEARER ASSIGNMENT FAILURE message is sent instead.

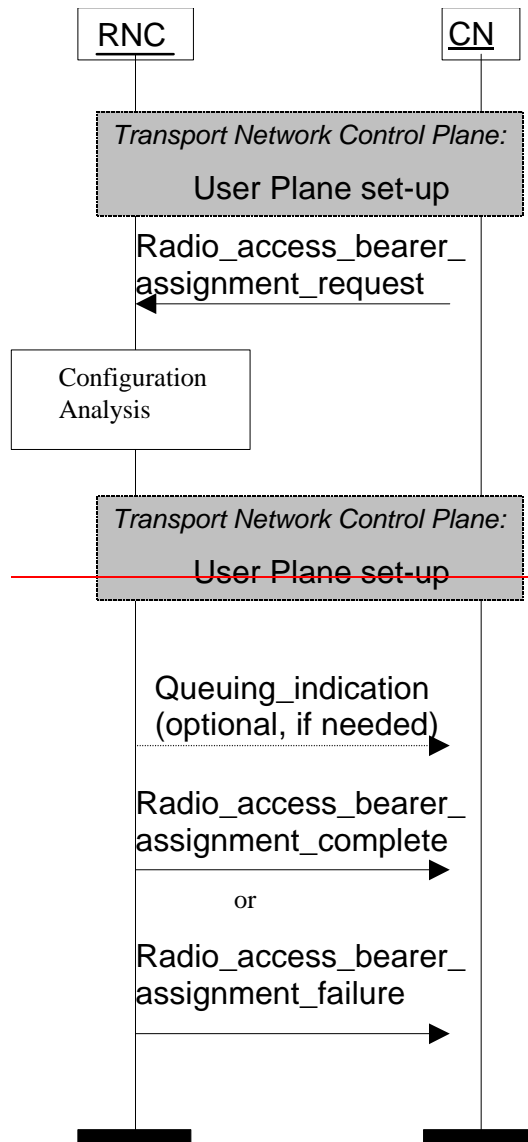
Such a message contains part or whole of the following information :

- The list of the bearer identities for the bearer successfully established or modified, if not already indicated ; with each bearer identity is provided the negotiable parameters as chosen by the UTRAN.
- The list of the bearers which has not been, and will not be, established, with for each a cause ;
- The list of the bearers which have been released, with for each a cause, if not already indicated.
- Localisation data, when the AN got more information on where is the MS while running the procedure.

A RANAP QUEUING INDICATION message can be sent to the requesting CN element prior to the RANAP RADIO ACCESS BEARER ASSIGNMENT ~~COMPLETE~~RESPONSE or RANAP RADIO ACCESS BEARER ASSIGNMENT FAILURE message to indicate that only part of the request has been fulfilled, and that the rest has been in queue. This message contains the same kind of information as the RANAP RADIO ACCESS BEARER ASSIGNMENT ~~COMPLETE~~RESPONSE message.

A RANAP ~~RAB RELEASE REQUEST~~BEARER-CLEARED INDICATION message shall be sent to a CN element to indicate a bearer, or bearers, previously established between this element and the UEMS and which have been released that due to pre-emption.

The signalling flow for the Radio access bearer assignment procedure has been illustrated in ~~Figure 17~~Figure 11 ~~Figure 8~~.



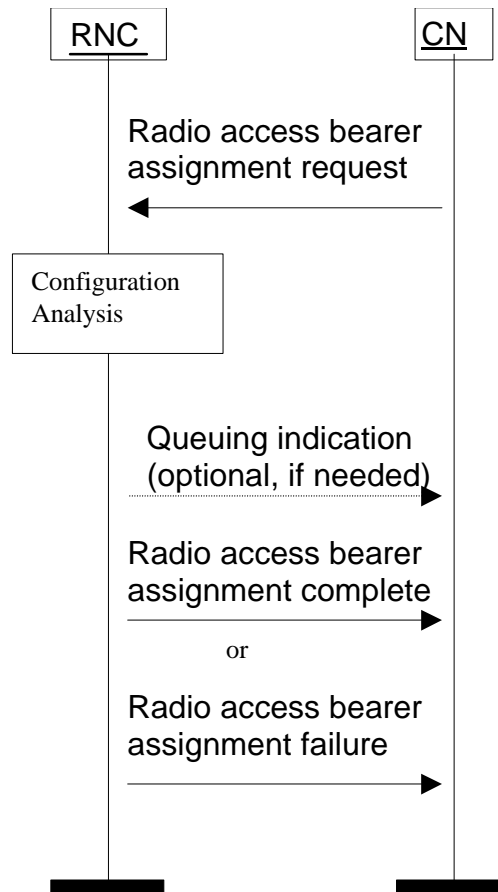


Figure ~~17.1.8~~ **17.1.8**. Radio Access Bearer Assignment procedure.

Iu Release Request

[Editor's note: In RAN WG3 meeting #5 it was decided to extract Iu Release Request to a separate elementary procedure. The response to this procedure is described in the following section. The Editor has proposed this structure.]

If the release of the radio bearers assigned to a particular UE is required because of a UTRAN generated reason (e.g. "O and M intervention", "equipment failure", "RAB pre-empted") then, the RNS controlling the Iu connection(s) of that particular UE shall generate an Iu RELEASE REQUEST message towards the CN. If it exists two Iu connections for that particular UE, then an Iu RELEASE REQUEST message shall be sent to CN domain.

If the contact with the UE is lost then an Iu RELEASE REQUEST message shall be sent to the CN node(s) having an Iu connection with the RNS for that particular UE.

The Iu RELEASE REQUEST message shall include a Cause Information Element, indicating the reason for the release.

The signalling flow for Iu Release procedure due to UTRAN generated reasons is shown in ~~Figure 19~~ **Figure 13**:



Figure 1913. Iu Release Request procedure.

8.3 Iu Release

General

The CN uses the IU RELEASE COMMAND message to release all resources in the SRNS related to this Iu connection.

The Iu Release procedure can be initiated for the following reasons:

- Completion of transaction between UE and CN
- UTRAN generated reasons
- Completion of successful handover or SRNS relocation

The Iu Release procedure messages i.e. Iu RELEASE REQUEST, Iu RELEASE COMMAND, Iu RELEASE COMPLETE are sent as connection oriented messages over the appropriate Iu connection.

8.3.1 Iu Release due to completion of transaction between UE and CN

The release of assigned radio bearers at the end of a transaction will take place as follows:

Release negotiation will take place directly between the UE and CN using transparent messages via UTRAN. The CN will then send an Iu RELEASE COMMAND, indicating that the radio bearers(s) and Iu resources should be released. After the Iu RELEASE COMMAND has been sent, the CN shall not send further RANAP connection oriented messages on this particular connection, except Iu RELEASE COMMAND.

The Iu RELEASE COMMAND message shall include a Cause Information Element, indicating the reason for the release.

The RNS at the opposite access point shall initiate the release of the user plane resources allocated to the connection, if any.

When the RNS receives the Iu RELEASE COMMAND:

- 1) The clearing on the radio interface initiated
- 2) The RNS returns an Iu RELEASE COMPLETE message to the CN originating the Iu RELEASE COMMAND message and takes action to return any assigned user plane resources to idle. (The RNC need not wait for the radio channel release to be completed before returning the Iu RELEASE COMPLETE message.)

The signalling flow for Iu Release procedure due to completion of transaction between UE and CN is shown in [Figure 21](#) ~~Figure 14~~ ~~Figure 9~~:

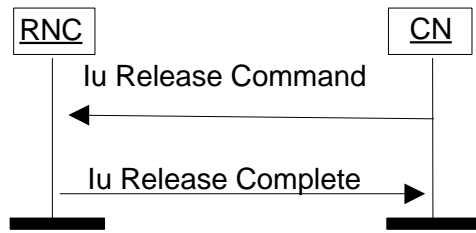


Figure 21149. Iu Release: Completion of transaction between UE and CN.

8.3.2 Iu Release due to UTRAN generated reasons

If the release of the radio bearers assigned to a particular UE is required because of a UTRAN generated reason (e.g. "O and M intervention", "equipment failure") then, the RNS controlling the Iu connection(s) of that particular UE shall generate an Iu RELEASE REQUEST message towards the CN. If it exists two Iu connections for that particular UE, then an Iu RELEASE REQUEST message shall be sent to CN domain.

If the contact with the UE is lost then an Iu RELEASE REQUEST message shall be sent to the CN node(s) having an Iu connection with the RNS for that particular UE.

The Iu RELEASE REQUEST message shall include a Cause Information Element, indicating the reason for the release.

On receipt of an Iu RELEASE REQUEST message, the CN node shall initiate the release, as defined above, by sending an Iu RELEASE COMMAND message. On receipt of this message the RNS shall, if the resources are not already released, release the resources in the normal way. The procedure is always terminated with an Iu RELEASE COMPLETE to the CN originating the Iu RELEASE COMMAND message.

The signalling flow for Iu Release procedure due to UTRAN generated reasons is shown in Figure 10:

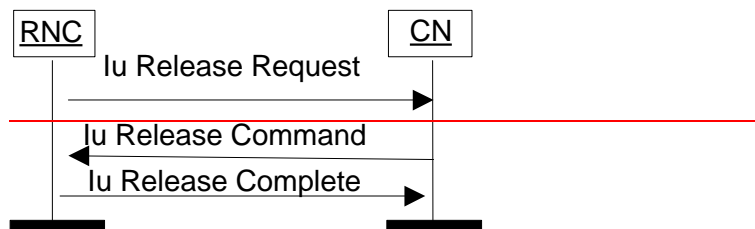


Figure 10. Iu Release: UTRAN generated reasons.

8.3.3 Iu Release due successful handover or SRNS relocation

In the case of a handover or SRNS relocation being successfully completed, then the resources at the old RNS are released by the CN using the Iu release sequence. The cause value used by the CN in the Iu RELEASE COMMAND message shall be set to the appropriate value: 'handover successful' or 'SRNS relocation successful'.

When the RNS detects one of these cause values in an Iu RELEASE COMMAND message, then it shall return an Iu RELEASE COMPLETE message to the appropriate CN and take action to return to idle any resources attached to that particular Iu connection.

In the case where there is a second Iu connection for that particular UE, then the RNC shall wait the second Iu RELEASE COMMAND message before returning the remaining resources assigned to that UE to idle. Once the second Iu RELEASE COMMAND is received, the procedure completes normally.

The signalling flow for Iu Release procedure due to completion of transaction between UE and CN is shown in [Figure 24](#) ~~Figure 16~~ ~~Figure 11~~:

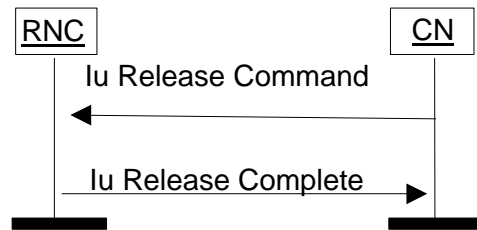


Figure ~~2416~~11. Iu Release: successful handover or SRNS relocation.

8.4 Overload Control

[Editor's note: TTC/ARIB does not have Overload control procedure. The ETSI procedure is used as a base.]

General

These procedures are defined to give some degree of flow control. At the UTRAN processor overload and overload in the capability to send signalling messages to the UE are catered for, and at the CN processor overload is catered for.

8.4.1 Philosophy

The philosophy used is to stem the traffic at source with known effect on the service. The algorithm used is:

- On receipt of the first OVERLOAD message or signaling point congested information, the traffic is reduced by one step. At the same time, timers $T(\text{igOC})(T(\text{igOR}))$ and $T(\text{inTC})(T(\text{inTR}))$ are started. During $T(\text{igOC})(T(\text{igOR}))$ all received overload messages or signaling point congested information are ignored in order not to reduce the traffic too rapidly. Reception of an OVERLOAD message or signaling point congested information after expiry of $T(\text{igOC})(T(\text{igOR}))$ but still during $T(\text{inTC})(T(\text{inTR}))$, will decrease the traffic load by one more step, and restart $T(\text{igOC})(T(\text{igOR}))$ and $T(\text{inTC})(T(\text{inTR}))$.
 - This step by step reduction of traffic is continued until maximum reduction is obtained by arriving at the last step. If $T(\text{inTC})(T(\text{inTR}))$ expires (i.e. no OVERLOAD message or signaling point congested information is received during $T(\text{inTC})(T(\text{inTR}))$) the traffic will be increased by one step and $T(\text{inTC})(T(\text{inTR}))$ will be started, unless full load has been resumed.
- NOTE: Timers $T(\text{igOC})$ and $T(\text{inTC})$ are running in the CN whilst Timers $T(\text{igOR})$ and $T(\text{inTR})$ are running in the UTRAN.
- The number of steps and the method of reducing the load is considered to be an implementation specific function.

There may be other traffic control mechanisms from O and M activities occurring simultaneously.

8.4.2 Overload at the CN

The CN can indicate to the RNC that it is in a congested state by sending an OVERLOAD message. This is sent as a connectionless global message.

At the UTRAN receipt of this message causes the reduction of traffic to the CN node sending the message, ~~using the method described in subclause 9.2.2.4.1.~~

The signalling flow for Overload at the CN is shown in ~~Figure 26~~ ~~Figure 17~~ ~~Figure 12~~.

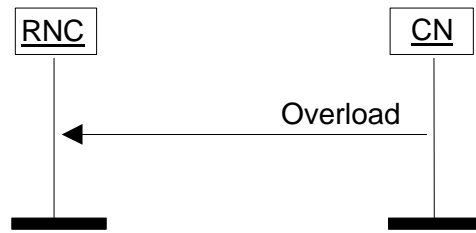


Figure ~~2617~~12. Overload at the CN.

8.4.3 Overload at the UTRAN

If the UTRAN is not capable to send signalling messages to the UE due to overloaded resources then the UTRAN sends an OVERLOAD message to the CN, ~~with the appropriate cause (Cause value: overload in the capability to send~~

~~If the UTRAN processing is overloaded then the RNC sends an OVERLOAD message with the Cause value: processor~~

~~The CN originated traffic is reduced in accordance with the method described in subclause 9.2.2.4.1.~~

The signalling flow for Overload at the UTRAN is shown in ~~Figure 28~~Figure 18~~Figure 13~~.

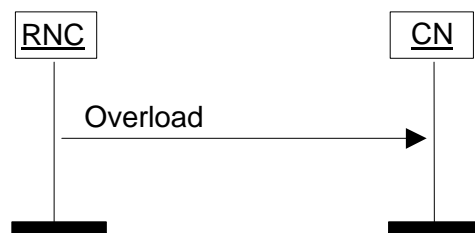


Figure ~~2818~~13. Overload at the UTRAN.

8.4.4 Message throughput congestion

~~If the lower layers of the protocol for Radio Network Control Plane Signaling Bearer become congested then it is assumed that the MTP congestion indication will take place and the source of the traffic will receive primitives from the transport protocols resulting in it reducing the generated load.~~

~~A suitable method to achieve this reduction could be based on that given in subclause 9.2.2.4.1.~~

8.5 Reset

General

The purpose of the reset procedure is to initialise the UTRAN and CN in the event of a failure. The procedure is a global procedure applying to a whole RNC (instead of a particular UE), and therefore all messages relating to the reset procedure are sent as global messages using the connectionless mode of the signalling connection.

If only a limited part of the CN or UTRAN has suffered a failure then Radio Access Bearer Assignment Request procedures (indicating bearer release) can be used to clear only the affected Radio Access Bearers.

8.5.1 Reset at the UTRAN

In the event of a failure at the UTRAN which has resulted in the loss of transaction reference information, a RESET message is sent to the CN. This message is used by the CN to release affected Radio Access Bearers and erase all affected references.

After a guard period of T(RatR) seconds a RESET ACKNOWLEDGE message is returned to the UTRAN indicating that all references have been cleared.

The signalling flow for Reset at the UTRAN is shown in [Figure 30](#)~~Figure 19~~[Figure 14](#).

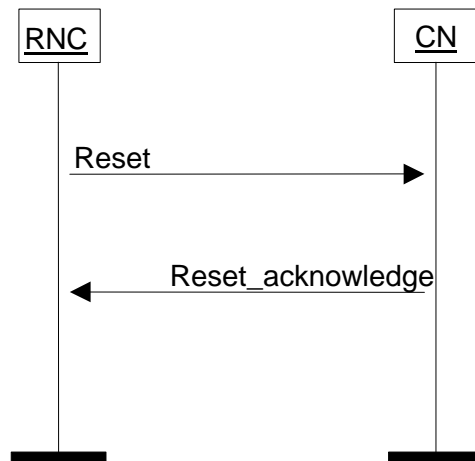


Figure [30](#)~~19~~[14](#). Reset at the UTRAN.

8.5.2 Reset at the CN

In the event of a failure at the CN which has resulted in the loss of transaction reference information, a RESET message is sent to the RNC. This message is used by the UTRAN to release affected Radio Access Bearers and erase all affected references.

After a guard period of T(RatC) seconds a RESET ACKNOWLEDGE message is returned to the CN, indicating that all Ues which were involved in a call are no longer transmitting and that all references at the UTRAN have been cleared.

[Figure 32](#)~~Figure 20~~[Figure 15](#) shows the signalling flow for Reset at the CN.

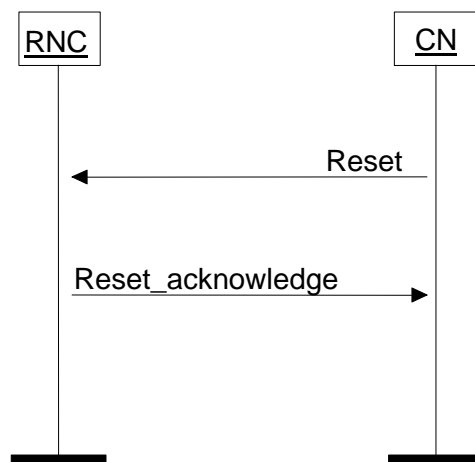


Figure [32](#)~~20~~[15](#). Reset at the CN.

8.5.3 Abnormal Conditions

8.5.3.1 Abnormal Condition at the UTRAN

If the RNC sends a RESET message to the CN and receives no RESET ACKNOWLEDGE message within a period $T(\text{RafC})$ then it shall repeat the entire reset procedure. The sending of the RESET message is repeated a maximum of n times where n is an operator matter. After the n -th unsuccessful repetition the procedure is stopped and the maintenance system is informed.

8.5.3.2 Abnormal Condition at the CN

If the CN sends a RESET message to the RNC and receives no RESET ACKNOWLEDGE message within a period $T(\text{RafR})$ then it shall repeat the entire reset procedure. The sending of the RESET message is repeated a maximum of n times where n is an operator matter. After the n -th unsuccessful repetition the procedure is stopped and the maintenance system is informed.

8.5.3.3 Crossing of Reset messages

Actions for the case, when the entity, which has sent a RANAP RESET message and is waiting for a RANAP RESET ACKNOWLEDGE message, but receives a RANAP RESET message are FFS.

8.6 Common Id

This procedure is needed, if the MM concept will require the UTRAN to send a page message on the existing RRC connection.

The purpose of the RANAP Common Id procedure is to allow the RNC to create a reference between the IMSI of a user and the RRC connection of that user. This is achieved by sending the IMSI of a verified user from the CN to the RNC. The RNC is then able to check whether there is already signaling bearer to the UE when a CN starts connection establishment by sending Paging message. The signaling bearer can be already used by an other CN, and if this is the case, the RNC uses it to send the Paging message to the MS.

The CN sends a COMMON ID message after it has ensured the identity of UE. The message contains the IMSI of the user. The RNC associates the permanent identity to the RRC Connection of that user and saves it for the duration of the RRC connection. The signalling flow Common Id procedure is shown in [Figure 34](#)~~Figure 21~~~~Figure 16~~.



Figure ~~34~~~~21~~~~16~~. Common Id procedure.

8.7 Paging

PAGING messages for all UEs shall be sent via the RANAP as a connectionless message. These will include some information to allow derivation of the paging population number, the IMSI of the user to be used as the Common Id of the user in the RNC, the Id of the User to be used in the paging channel (e.g. TMSI); they may also include information on the subsequent transaction related to the paging. A corresponding radio interface paging message transmitted over the radio interface at the appropriate time. The issue of storing the RANAP PAGING message for future paging repetition is FFS.

It should be noted that each RANAP PAGING message on the CN-UTRAN interface relates to only one UE and therefore the UTRAN has to pack the pages into the relevant radio interface paging message.

The CN node sending the RANAP PAGING message shall set the CN domain indicator according to its own type i.e. CS domain or PS domain.

Note. Once the domain distribution is clarified with SA2 the Paging indicator may need to be modified.

A single RANAP PAGING message across the CN to UTRAN interface contains information on the area in which the page shall be broadcast. This is indicated with UE location parameter (content FFS, e.g. LA or RA).

The signalling flow of the paging procedure is illustrated in [Figure 36](#)~~Figure 22~~[Figure 17](#).



Figure [36](#)~~22~~[17](#). Paging procedure.

8.8 Trace Invocation

[Editor's note: TTC/ARIB does not have Trace Invocation procedure. The ETSI procedure is used as a base.]

The purpose of the trace invocation procedure is to inform the receiving entity that it should begin producing a trace record on this particular transaction.

The trace is invoked by the CN sending a RANAP CN INVOKE TRACE message to the UTRAN.

The events and parameters to be recorded are indicated in the 'Trace type' information element.

The element 'OMCId', if present, indicates the OMC to which the record is destined.

The CN may allocate and include an 'CN transaction reference' (typically a call reference) into the RANAP CN INVOKE TRACE message. The transaction reference is contained in the information element 'TransactionId'.

The message includes a trace reference which is allocated by the entity which triggered the trace.

The element 'TriggerId', if present, indicates the entity which triggered the trace.

The trace reference, triggerId and transactionId Information Elements are used to tag the trace record to allow simpler construction of the total record by the entity which combines trace records.

The messages are not acknowledged and are sent as a connection oriented message on the connection on which a trace is required.

The signalling flow of the Trace invocation procedure is shown in [Figure 38](#)~~Figure 23~~[Figure 18](#).

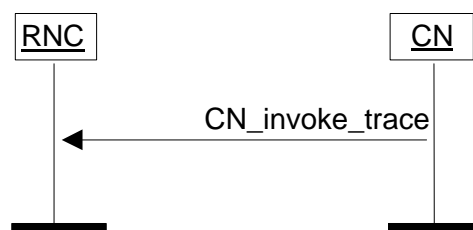


Figure [38](#)~~23~~[18](#). Trace Invocation procedure.

8.9 Cipher Mode Control

8.9.1 Successful operation

The cipher mode control procedure allows the CN to pass cipher mode information to the UTRAN to select and load the user data and signaling encryption device with the appropriate key.

This is achieved by sending the UTRAN a RANAP CIPHER MODE COMMAND message. Receipt of the message at the UTRAN will cause the generation of a radio interface CIPHERING MODE COMMAND message and, if applicable, invoke the encryption device and start stream ciphering.

If within the RANAP CIPHER MODE COMMAND, the signaling element 'Cipher response mode' is present and indicates 'IMEI must be included by the Mobile Station', then the UTRAN shall request in the radio interface message CIPHERING MODE COMMAND the Mobile Station to include its IMEI in the radio interface CIPHERING MODE COMPLETE message.

In the RANAP CIPHER MODE COMMAND the CN specifies which of the ciphering algorithms may be used by the UTRAN. The UTRAN then selects internally an appropriate algorithm, taking into account the UE ciphering capabilities. The UTRAN can deduce from the UE capability information of the supported algorithms. The RANAP CIPHER MODE COMPLETE message returned to the CN indicates the chosen ciphering algorithm. The set of permitted ciphering algorithms specified in the RANAP CIPHER MODE COMMAND shall remain applicable for subsequent Assignments and Intra-UTRAN Handovers.

The RANAP CIPHER MODE COMMAND and RANAP CIPHER MODE COMPLETE messages are sent as connection oriented messages via the appropriate signalling connection.

Receipt of the radio interface CIPHERING MODE COMPLETE message (or other correctly deciphered layer 2 frame) from the radio interface is used internally within the UTRAN to achieve radio interface ciphering synchronisation. When the UTRAN receives the radio interface CIPHERING MODE COMPLETE from the UE a RANAP CIPHER MODE COMPLETE message is returned to the CN.

The handling of ciphering keys from two CN entities is FFS.

The signalling flow of the successful Cipher mode control procedure is shown in [Figure 40](#) ~~Figure 24~~ ~~Figure 19~~.

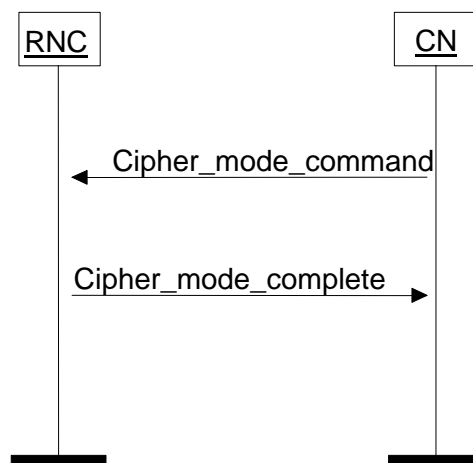


Figure [40](#) ~~24~~ ~~19~~. Cipher Mode Control procedure, successful case.

8.9.2 Abnormal conditions

If the UTRAN or the UE is unable to support the ciphering algorithm specified in the RANAP CIPHER MODE COMMAND message then it shall return a RANAP CIPHER MODE REJECT message with Cause value 'Ciphering algorithm not supported'. A RANAP CIPHER MODE REJECT message shall also be returned if the CN requests a change of ciphering algorithm when ciphering is already active.

The signalling flow of the Cipher mode control procedure in abnormal conditions is shown in [Figure 42](#)~~Figure 25~~[Figure 20](#).

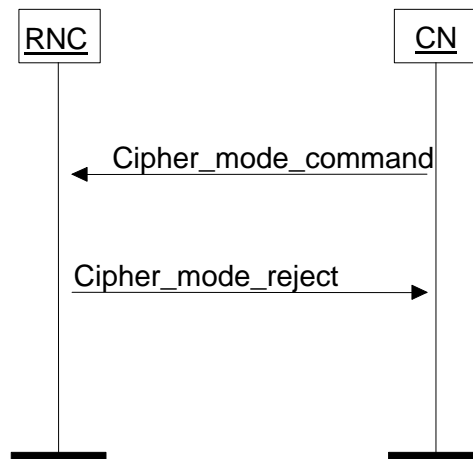


Figure [42](#)~~25~~[20](#). Cipher Mode Control procedure, unsuccessful case.

8.10 CN Information Broadcast

[Editor's note: TTC/ARIB does not have CN Information broadcast procedure. The ETSI procedure is used as a base.]

A functionality of the (UT)RAN is to broadcast repetitively to all users [in idle mode] system information as provided by the core network. A core network element sets or modifies the CN system information by sending a RANAP CN INFORMATION BROADCAST REQUEST message which indicates:

- The information pieces to be broadcast, as a number of bit strings. The internal structure of these bit strings is not known or analysed by the RAN, and is specified as part of the CN-MS protocols.
- With each bit string, a geographical area where to broadcast it.
- With each bit string, some categorisation parameters to be used by the RAN to determine how to schedule the repetition cycle.

If the UTRAN can broadcast the information as requested, a RANAP CN INFORMATION BROADCAST CONFIRM message is returned to the CN.

If the UTRAN can not broadcast the information as requested, a RANAP CN INFORMATION BROADCAST REJECT message is returned to the CN.

Each information piece is broadcast in the intersection between the indicated geographical area and the area under control by the receiving RNC. It is broadcast until explicitly changed or a reset occurs. A CN element will run this procedure typically after each reset, and whenever the information needs to be changed.

Between a reset and the first reception of this message, what is broadcast is FFS. However, great care shall be taken to ensure that UEs do not reselect another PLMN and cause e.g. a surge of location updating on that other PLMN.

8.11 Direct Transfer

The Direct Transfer procedure is used to carry UE-CN signalling messages over the Iu Interface. The UE-CN signalling messages are not interpreted by the UTRAN, and their content (e.g. MM or CC message) is outside the scope of this specification. The UE-CN signalling messages are transported as a parameter in the Direct Transfer messages.

When the CN has message that has to be sent to the UE (e.g. a CC or MM message) it will send DIRECT TRANSFER to the RNC including the CN to UE message as a parameter. The signalling flow for the CN originated Direct transfer procedure is shown in [Figure 44](#)~~Figure 26~~[Figure 21](#).

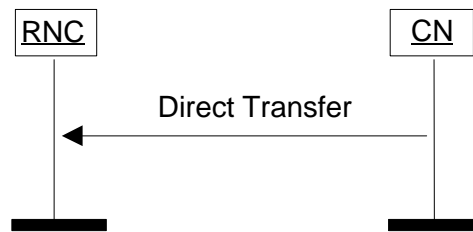


Figure 442621. Direct Transfer, CN originated.

When the RNC has received a message from the UE that has to be sent to the CN without interpretation (e.g. a CC or MM message in response to the previously sent CC or MM message from the CN) it will send DIRECT TRANSFER to the CN and including the UE to CN message as a parameter. The signalling flow for the UTRAN originated Direct transfer procedure is shown in [Figure 462722](#) [Figure 27](#) [Figure 22](#).



Figure 462722. Direct Transfer, RNC originated.

8.12 Initial UE Message

When the Iu signaling connection establishment is performed by the RNC, the radio interface initial layer 3 message received from the UE is proceeded.

The RNC shall analyze the protocol discriminator of the message and if entire radio interface initial layer 3 message (e.g. CM SERVICE REQUEST, LOCATION UPDATE REQUEST, PAGING RESPONSE, IMUI DETACH) is also passed to the CN, using an INITIAL UE MESSAGE. The RNC does not analyze the contents of the initial layer 3 message, it may be added the other information (e.g. chosen channel and cell Identifier)..

The signalling flow for Initial UE Message procedure is shown in [Figure 482823](#) [Figure 28](#) [Figure 23](#).

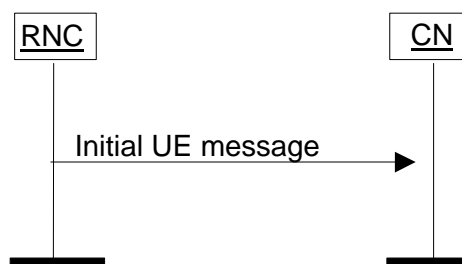


Figure 482823. Initial UE Message procedure.

8.13 Location Reporting Control

Note. This procedure needs to be aligned with the GSM location services.

8.13.1 Normal operation

The LOCATION REPORTING CONTROL message is issued from the CN to the RNC. It is used to initiate, modify or stop location reporting from RNC to CN, while the UE, whose location is to be reported has its connection with the CN. Each ongoing Location reporting is assigned a reporting number, which will be used in Location Report messages triggered by the respective Location Reporting Control procedure.

Note. The identification of different location reports is FFS.

The signalling flow for Location Request procedure is shown in [Figure 50](#)~~Figure 29~~[Figure 24](#).

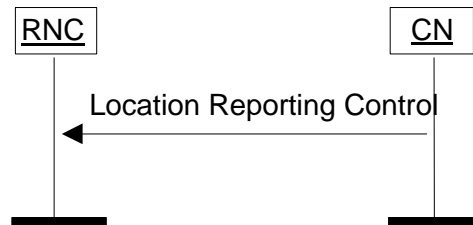


Figure [50](#)~~29~~[24](#). Location Reporting Control procedure.

8.13.2 Abnormal conditions

8.13.2.1 Abnormal conditions in RNC

If RNC receives a Location Reporting Control message indicating a change in measurement parameters which are in contradiction to existing parameters RNC shall ignore the existing parameters in RNC and assume the parameters given in the new message as correct. *Note. The definition of existing parameters is FFS.*

8.14 Location Report

8.14.1 Successful operation

The LOCATION REPORT message is issued from the RNC to the CN. It is used to provide the UE location information to the CN. This may be used as a response for the LOCATION ~~REPORTING CONTROL~~[REQUEST](#) message. Other triggers of this message are FFS.

The signalling flow for Location Report procedure is shown in [Figure 52](#)~~Figure 30~~[Figure 25](#).

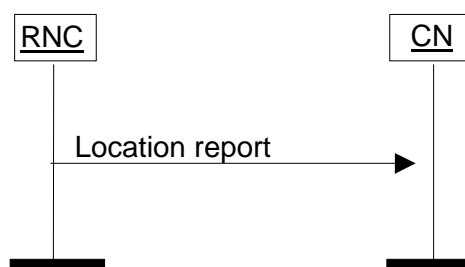


Figure [52](#)~~30~~[25](#). Location Report procedure.

8.14.2 Unsuccessful operation

If the RNC can not deliver the location information as requested, RNC shall indicate UE location to be "Undetermined". A cause value shall be added to indicate the reason for the undetermined location.

8.14.3 Abnormal conditions

8.14.3.1 Abnormal conditions in CN

If CN receives a Location Report message reporting Location that was not requested by CN, CN should stop the indicated location reporting by utilising Location Reporting Control procedure. (FFS).

8.15 Error Indication

General

The Error Indication procedure is used to carry error messages over the Iu Interface. The procedure uses the connectionless mode of the signalling connection.

8.15.1 CN originated Error Indication

On the PS side, the SGSN may send an Error Indication to the RNC if it receives a G-PDU with an unknown Flow Label. The Cause Value to be used is:

- Unknown Flow Label'

For the Cause Value Unknown Flow Label', both Binding Identity and Network Layer Address is mandatory.

The Binding Identity, i.e. the Flow Label, and the Network Layer Address used in the Error Indication message shall be fetched from the G-PDU that triggered the procedure.

The signalling flow for the CN originated Error Indication procedure is shown in [Figure 54](#)~~Figure 31~~[Figure 26](#).

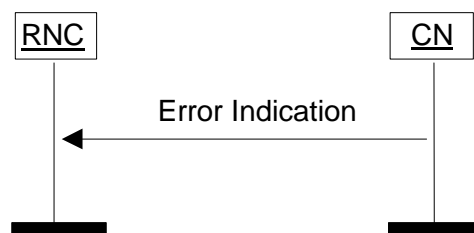


Figure [54](#)~~31~~[26](#). Error Indication, CN originated.

8.15.2 RNC originated Error Indication

On the PS side, the RNC may send an Error Indication to the SGSN if it receives a G-PDU with an unknown Flow Label. The Cause Value to be used is:

- Unknown Flow Label'

For the Cause Value Unknown Flow Label', both Binding Identity and Network Layer Address is mandatory.

The Binding Identity, i.e. the Flow Label, and the Network Layer Address used in the Error Indication message shall be fetched from the G-PDU that triggered the procedure.

The signalling flow for the UTRAN originated Error Indication procedure is shown in [Figure 56](#)~~Figure 32~~[Figure 27](#).



Figure ~~5632~~27. Error Indication, RNC originated.

9 Elements for RANAP communication

9.1 Message functional definition and content

[Editor's note: ETSI has not yet discussed the parameters of RANAP messages. The text from the TTC/ARIB document will be used as a starting point, but the contents is not agreed and is FFS. In the cases when the messages are the same, TTC/ARIB agree to adopt the ETSI name for the message.]

For each message there is, a table listing the signaling elements in their order of appearance in the transmitted message.

All the RANAP messages are listed in the following table:

Message name	Reference
RADIO ACCESS BEARER ASSIGNMENT REQUEST	
RADIO ACCESS BEARER ASSIGNMENT RESPONSE	
RADIO ACCESS BEARER ASSIGNMENT FAILURE	
RADIO ACCESS BEARER RELEASE REQUEST	
QUEUEING INDICATION	
COMMON ID	
DIRECT TRANSFER	
INITIAL UE MESSAGE	
LOCATION REPORTING CONTROL REQUEST	
LOCATION REPORT	
CIPHER MODE COMMAND	
CIPHER MODE COMPLETE	
CIPHER MODE REJECT	
PAGING	
IU RELEASE COMMAND	
IU RELEASE COMPLETE	
IU RELEASE REQUEST	
RELOCATION REQUIRED	
RELOCATION REQUEST	
RELOCATION REQUEST ACKNOWLEDGE	
RELOCATION COMMAND	
RELOCATION DETECT	
RELOCATION COMPLETE	
RELOCATION PREPARATION FAILURE	
RELOCATION FAILURE (FFS)	
RELOCATION CANCEL	
RELOCATION CANCEL ACKNOWLEDGE	
RESET	
RESET ACKNOWLEDGE	
OVERLOAD	
CN INVOKE TRACE	
CN INFORMATION BROADCAST REQUEST	

<u>CN INFORMATION BROADCAST CONFIRM</u>	
<u>CN INFORMATION BROADCAST REJECT</u>	
<u>CONFUSION</u>	
<u>ERROR INDICATION</u>	

Table 1. List of RANAP messages.

9.1.1 Message Contents

9.1.1.1 RADIO ACCESS BEARER ASSIGNMENT REQUEST

Information element	Reference	Type
Message type		M
Bearers x n to be setup or modified		C1
<u>RA</u> Bearer ID		M
<u>NAS Binding Information</u>		<u>M</u>
Bearer parameters		M (1)
<u>User Plane mode</u>		<u>M</u>
Transport Address		M
Iu transport association		M
Priority level and pre-emption indication		O (2)
Bearer linking		O
Bearers x n to be released		C1
<u>RA</u> Bearer ID		M
Cause		M

C1 At least one group shall be present.

- (1) This includes all the necessary parameters for bearers (both for MSC and SGSN) including QoS.
- (2) It needs to be clarified how this parameter is in relation to priority parameters already included with the Bearer parameters.

Note. It needs to be clarified how the re-ordering information as proposed in Tdoc 276 relates to QoS attribute SDU in-sequence delivery.

9.1.1.2 RADIO ACCESS BEARER ASSIGNMENT RESPONSE

Information element	Reference	Type
Message type		M
Location Identifier		O
Bearers x n established or modified		C1
<u>RA</u> Bearer ID		M

Bearer parameters		O (1)
Transport address		M (2)
Iu transport association		M (2)
 Bearers x n released		C1
RA Bearer ID		M
Cause		M

C1 At least one group shall be present.

- (1) Bearer parameters are needed only if something has changed.
- (2) Always present for SGSN.

9.1.1.3 RADIO ACCESS BEARER ASSIGNMENT FAILURE

Information element	Reference	Type
Message type		M
Location Identifier		O
 Bearers x n successfully setup or modified		C1
RA Bearer ID		M
Bearer parameters		O (1)
Transport address		M (2)
Iu transport association		M (2)
 Bearers x n failed to setup		C1
RA Bearer ID		M
Cause		M
 Bearers x n released		C1
RA Bearer ID		M
Cause		M

C1 At least one group shall be present.

- (1) Bearer parameters are needed only if something has changed.
- (2) Always present for SGSN.

9.1.1.4 RADIO ACCESS BEARER RELEASE REQUEST

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		RNC-CN	M	
Length		RNC-CN	M	
Message Compatibility Information		RNC-CN	M	
Bearer ID		RNC-CN	M (1)	
Cause		RNC-CN	M	

~~1. This element should be used instead of Call Id, however if Bearer Id has not been supported, it might be used Call Id.~~

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Bearers x n to be released</u>		<u>C1</u>
<u>__RAB ID</u>		<u>M</u>
<u>__Cause</u>		<u>M</u>

C1 At least one group shall be present.

QUEUEING INDICATION

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Bearers x n to be queued</u>		<u>C1</u>
<u>__RAB ID</u>		<u>M</u>

C1 At least one group shall be present.

9.1.1.5 COMMON ID

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		CN-RNC	M	
Length		CN-RNC	M	
Message Compatibility Information		CN-RNC	M	
IMUI		CN-RNC	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Common ID (e.g. IMSI)</u>		<u>M</u>

9.1.1.6 DIRECT TRANSFER

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		Both	M	
Length		Both	M	
Message Compatibility Information		Both	M	
Direct Transfer Information		Both	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>NAS PDU</u>		<u>M</u>

9.1.1.7 INITIAL UE MESSAGE

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		RNC-CN	M	
Length		RNC-CN	M	
Message Compatibility Information		RNC-CN	M	
Layer 3 Information		RNC-CN	M	
Chosen Channel		RNC-CN	O(1)	
Cell Identifier		RNC-CN	O	

~~1. This element is optionally send by the RNC to give the CN a description of the channel rate/type on which the initial layer 3 message was received.~~

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Location Information</u>		<u>M</u>
<u>NAS Layer 3 Information</u>		<u>M</u>

9.1.1.8 LOCATION REPORTING CONTROL REQUEST

~~The information elements for this message are FFS.~~

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Request type</u>		<u>M</u>

9.1.1.9 LOCATION REPORT

~~The information elements for this message are FFS.~~

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Location Information</u>		<u>M</u>

9.1.1.10 CIPHER MODE COMMAND

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		CN-RNC	M	
Length		CN-RNC	M	
Message Compatibility Information		CN-RNC	M	
Cipher Information		CN-RNC	M	
Cipher Response Mode		CN-RNC	O(1)	

~~1. The element is used by the CN to indicate whether the IMEI is to be included in the CIPHER MODE COMPLETE message to be sent by the UE. The necessity of this element is FFS.~~

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Encryption Information</u>		<u>M(1)</u>

~~(1) Encryption information includes key(s) and permitted algorithms.~~

Note 1. It is FFS whether the NAS information should be included in this message.

Note 2. The possibility to cipher only some of the RABs is FFS.

9.1.1.11 CIPHER MODE COMPLETE

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		RNC-CN	M	
Length		RNC-CN	M	
Message Compatibility Information		RNC-CN	M	
Chosen Cipher Algorithm		RNC-CN	O	

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Chosen Encryption Algorithm</u>		<u>O</u>

Note 1. It is FFS whether the NAS information should be included in this message.

9.1.1.12 CIPHER MODE REJECT

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		RNC-CN	M	
Length		RNC-CN	M	
Message Compatibility Information		RNC-CN	M	
Cause		RNC-CN	M	

Information element	Reference	Type
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

9.1.1.13 PAGING

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		CN-RNC	M	
Length		CN-RNC	M	
Message Compatibility Information		CN-RNC	M	
IMUI		CN-RNC	M	
User ID (TMUI)		CN-RNC	O (1)	
Cell Identifier List		CN-RNC	M	

1. This element is omitted in the excepting case where the IMUI is used instead of the TMUI as a paging address at the radio interface.

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>CN Domain Indicator</u>		<u>M</u>
<u>IMSI</u>		<u>M</u>
<u>Temporary UE ID</u>		<u>O</u>
<u>Paging area ID</u>		<u>M</u>
<u>Paging Cause</u>		<u>O</u>

9.1.1.14 IU RELEASE COMMAND

<u>INFORMATION ELEMENT</u>	<u>REFERENCE</u>	<u>DIRECTION</u>	<u>TYPE</u>	<u>LEN</u>
Message Identifier		CN-RNC	M	
Length		CN-RNC	M	
Message Compatibility Information		CN-RNC	M	
Cause		CN-RNC	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

9.1.1.15 IU RELEASE COMPLETE

<u>INFORMATION ELEMENT</u>	<u>REFERENCE</u>	<u>DIRECTION</u>	<u>TYPE</u>	<u>LEN</u>
Message Identifier		RNC-CN	M	
Length		RNC-CN	M	
Message Compatibility Information		RNC-CN	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>

IU RELEASE REQUEST

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

9.1.1.16 RELOCATION REQUIRED

Information element	Reference	Type
Message type		M
<u>Cause</u>		<u>M</u>
Target RNC identification		M (1)
Source RNC to target RNC transparent field		<u>M</u> (2)

(1) The usage and format of this information element is FFS.

~~(2) Required only via one CN entity.~~

9.1.1.17 RELOCATION REQUEST

Information element	Reference	Type
Message type		M
<u>Cause</u>		<u>M</u>
Source RNC to target RNC transparent field		<u>M</u> (1)
Bearer x n to be setup		M
<u>RA</u> Bearer ID		M
Bearer parameters		M
<u>User Plane mode</u>		<u>M</u>
Transport address		M
Iu transport association		M
Priority level and pre-emption indication		O
Bearer linking		O

~~(1) Required only via one CN entity.~~

9.1.1.18 RELOCATION REQUEST ACKNOWLEDGE

Information element	Reference	Type
Message type		M
Target RNC to source RNC transparent field		O (1)
Bearer x n		O (2)
<u>RA</u> Bearer ID		M
Transport address		M (3)
Iu transport association		M (3)

(1) Required only via one CN entity.

(2) Always present for SGSN, and present for MSC if parameters have been modified by target RNC.

(3) Always present for SGSN.

9.1.1.19 RELOCATION COMMAND

Information element	Reference	Type
Message type		M
Target RNC to source RNC transparent field		O (1)

(1) Required only via one CN entity.

9.1.1.20 RELOCATION DETECT

Information element	Reference	Type
Message type		M

9.1.1.21 RELOCATION COMPLETE

Information element	Reference	Type
Message type		M

RELOCATION PREPARATION FAILURE

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

9.1.1.22 RELOCATION FAILURE

Information element	Reference	Type
Message type		M
Cause		M

RELOCATION CANCEL

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

RELOCATION CANCEL ACKNOWLEDGE

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>

9.1.1.23 RESET

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		Both	M	
Length		Both	M	
Message Compatibility Information		Both	M	
Cause		Both	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

9.1.1.24 RESET ACKNOWLEDGE

INFORMATION ELEMENT	REFERENCE	DIRECTION	TYPE	LEN
Message Identifier		Both	M	
Length		Both	M	
Message Compatibility Information		Both	M	

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>

OVERLOAD

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>

CN INVOKE TRACE

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Trace Type</u>		<u>M</u>
<u>Trigger ID</u>		<u>O</u>
<u>Trace Reference</u>		<u>M</u>
<u>UE Identity</u>		<u>O</u>
<u>OMC ID</u>		<u>O</u>

CN INFORMATION BROADCAST REQUEST

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>CN Domain Indicator</u>		<u>M</u>
<u>CN System Information piece x n</u>		<u>C1</u>
<u> NAS bit string</u>		<u>M</u>
<u> Broadcast area</u>		<u>M</u>
<u> Categorisation parameters</u>		<u>M</u>

C1 At least one group must be present.

Note 1. It is FFS how the broadcasting is turned off.

CN INFORMATION BROADCAST CONFIRM

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>

CN INFORMATION BROADCAST REJECT

<u>Information element</u>	<u>Reference</u>	<u>Type</u>
<u>Message type</u>		<u>M</u>
<u>Cause</u>		<u>M</u>

[Editor's note: The CONFUSION message is removed, since it is not included in procedure descriptions and no parameters are included for this message either.]

9.1.1.25CONFUSION

~~This message is sent in either direction in response to a message which can not be treated correctly for some reason, and for which another failure message can not substitute. The use of this message may be under operator control.~~

9.1.1.26ERROR INDICATION

Information element	Reference	Type
Message type		M
Cause		M
Binding ID		O
Source Network Layer Address		O

9.2 Information element functional definition and contents

[Editor's note: RANAP information elements have not yet been discussed in ETSI. If ASN.1 and BER will be used, section 9.2.4 may not be needed at all. The corresponding text from TTC/ARIB document will be included, but it has not been agreed and is FFS.]

Study item 7: Usage of ASN.1 and encoding rules versus the description of information elements in TTC/ARIB document.]

This paragraph contains the CODING of the signaling elements used.

9.2.1 RANAP coding standard

Length Indicator

It is desirable to have Length for messages and parameters because future version of protocol may have extension to the present message or parameter, and also variable size can be present in some parameters as well.

In case of message size exceeding 256 byte it is better to have 2 bytes for message LENGTH.

However it is enough to have 1 byte for parameter LENGTH.

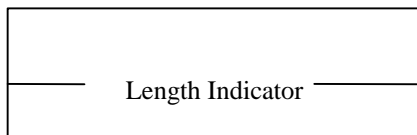


Fig. 9.2.4.1-1 Length Indicator for Message



Fig. 9.2.4.1-2 Length Indicator for Parameter

Compatibility Information

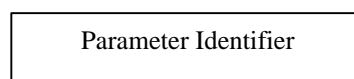
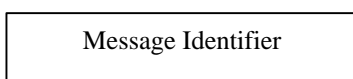
Compatibility Information is used in the situation of unrecognized messages or parameter. This parameter should be placed at a certain place then it is easy to pick up this parameter in any circumstances.

Consequently, the format can be as follow:

Message Identifier / Length / Compatibility Info / parameters

Parameter Identifier / Length / Compatibility Info / Fields

Figure 3 shows the coding format of message and Figure 4 shows the coding format of parameter.



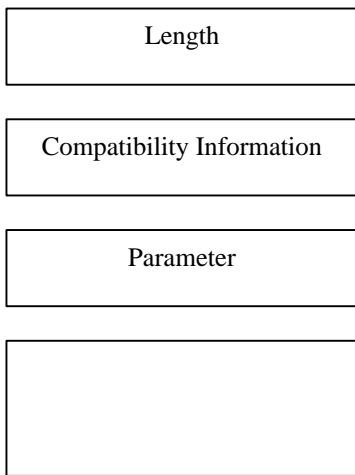


Fig. 9.2.4.1-3 Message Coding Format

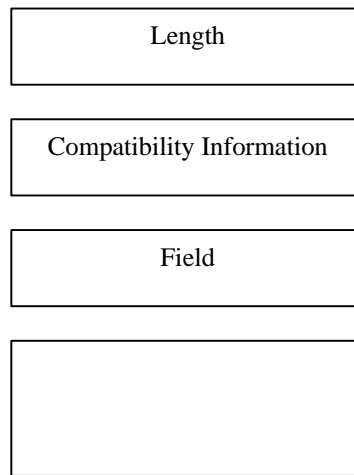


Fig. 9.2.4.1-4 Parameter Coding Format

Fixed size data and Variable size data in Field

It may have two types of field i.e. with variable size or fixed size in data of field. It has no any problem to specify the fixed size field. Figure5 shows an example of fixed size data in field.

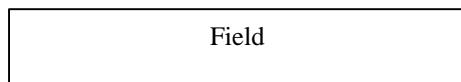


Fig. 9.2.4.1-5 Format for fixed size field

Regarding the variable size of data

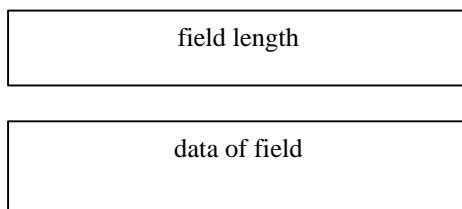


Fig. 9.2.4.1-6 Length method

9.2.2 Signaling Element Coding

~~The following convention are assumed for the sequence of transmission of bits and bytes:~~

~~— Each bit position is marked as 1 to 8. Bit 1 is the least significant bit and is transmitted first.~~

~~— In an element octets are identified by number, octet 1 is transmitted first, then octet 2 etc.~~

The elements used and their CODING are:

[Editor's note: The table needs to be revised.]

Element Identifier Coding	Element name	Reference
	Call ID	
	Bearer ID	
	User Information Rate	
	Information Transfer Capability	
	ATM Address	
	ATM Binding ID	
	Cause	
	RR Cause	
	MS Classmark for RAN	
	Direct Transfer Information	
	Layer 3 Information	
	IMUI	
	TMUI	
	Cipher Information	
	Cell Identifier List	
	Cell Identifier	
	Chosen Channel	
	Cipher Response Mode	
	Chosen Cipher Algorithm	
	Group Call Reference	
	Talker Flag	
	Layer 3 Radio Information	
	Response Request	

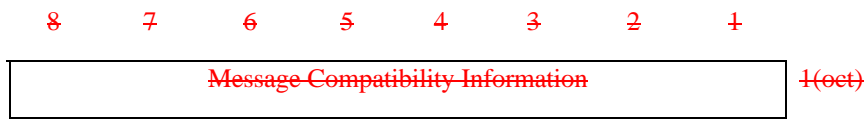
9.2.2.1 Message Type

Message Type uniquely identifies the message being sent. It is a single octet element, mandatory in all messages.

	8765-4321	Reserved
BEARER SETUP MESSAGES		RADIO ACCESS BEARER SETUP RADIO ACCESS BEARER SETUP RESPONSE RADIO ACCESS BEARER SETUP FAILURE
MODIFICATION MESSAGES		STREAMLINING STREAMLINING RESPONSE RADIO ACCESS BEARER RECONFIGURATION RADIO ACCESS BEARER RECONFIGURATION RESPONSE RADIO ACCESS BEARER RECONFIGURATION FAILURE
BEARER RELEASE MESSAGES		RADIO ACCESS BEARER RELEASE RADIO ACCESS BEARER RELEASE RESPONSE CONFUSION
GENERAL MESSAGE		RESET RESET ACKNOWLEDGE
		DIRECT TRANSFER INITIAL UE MESSAGE CIPHER MODE COMMAND CIPHER MODE COMPLETE CIPHER MODE REJECT PAGING REQUEST IU RELEASE IU RELEASE COMPLETE COMMON ID TA REQUEST TA REQUEST RESPONSE USER INFORMATION INQUIRY REQUEST USER INFORMATION INQUIRY RESPONSE
		HANDOVER REQUIRED HANDOVER REQUEST HANDOVER REQUEST ACKNOWLEDGE HANDOVER COMMAND HANDOVER DETECT HANDOVER COMPLETE HANDOVER FAILURE

9.2.2.2 Message Compatibility Information

Message Compatibility Information is used in the situation of unrecognized messages.



~~Figure 9.2.4.2.2—Message Compatibility Information~~

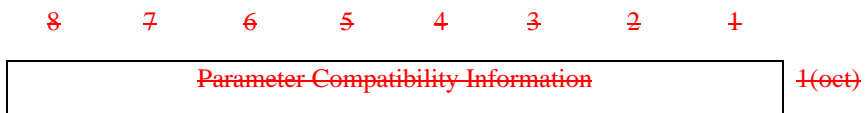
Table 9.2.4.2.2—Message Compatibility Information octet

Bit	
8	Reserved
÷	
4	Pass-On not possible
3	Discard Message
2	Send Notify (1)
1	Release Indicator

1. It should be used in CONFUSION message

9.2.2.3 Parameter Compatibility Information

Parameter Compatibility Information is used in the situation of unrecognized messages.



~~Figure 9.2.4.2.3—Parameter Compatibility Information~~

Table 9.2.4.2.3—Parameter Compatibility Information octet (The detail is FFS.)

Bit	
8	Reserved
÷	
4	Pass-On not possible
3	Discard Message
2	Send Notify (1)
1	Release Indicator



It should be used in CONFUSION message

9.2.2.4 Call ID

This element is included the Transaction Identifier (TI), which belongs to the Call Control protocol.

The Transaction Identifier fields are coded as defined in CC Protocol description.

This element may be not used.

9.2.2.5 Bearer ID

The Bearer Identifier fields are coded as defined in CC Protocol description.

9.2.2.6 User Information Rate

This element is included the User Information rate which has been requested by the UE.

[Note: The following should be described the coding format.(The detail is FFS.)]

9.2.2.7 Information Transfer Capability

This element is included Information Transfer Capability which has been requested by the UE.

[Note: The following should be described the coding format.(The detail is FFS.)]

9.2.2.8 ATM Address

This element should include the AAL2 address or ATM address.

[Note: The following should be described the coding format.(The detail is FFS.)]

9.2.2.9 ATM Binding ID

This element is included ATM Binding ID.

[Note: The following should be described the coding format.(The detail is FFS.)]

9.2.2.10 Cause

This element is used to indicate the reason for a particular event to have occurred and is coded as shown below.

The cause value is a single octet element if the extension bit (bit 8) is set to 0. If it is set to 1 then the cause value is a 2 octet field.

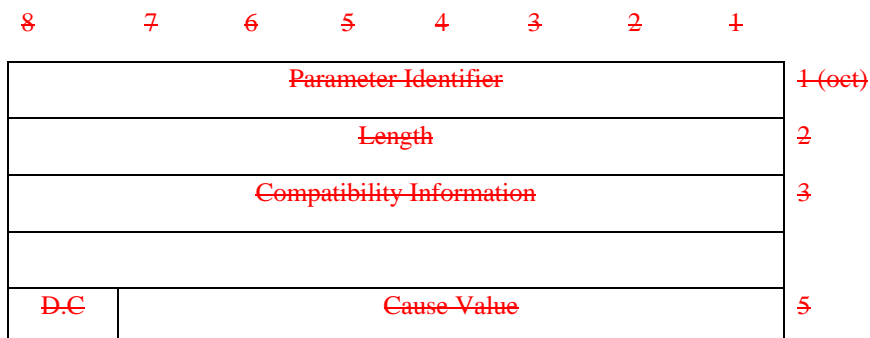


Figure 9.2.4.2-10 format of Cause

~~Cause Value:~~

~~Class : Normal event~~

~~Class: Normal event~~

~~Class: Resource unavailable~~

~~Class : Service or option not available~~

~~Class : Service or option not implemented~~

~~Class : invalid message (eg parameter out of range)~~

~~Class : protocol error~~

~~Class : interworking~~

The following table shows example of cause value:

Table 9.2.4.2 10 ~~cause value~~

Cause Value		
class	value	
765	4321	
		Normal termination Mobile illegal (ex. Authentication NG) O & M intervention Equipment failure Protocol error Message type non-existent or not implemented Information element/parameter non-existent or not implemented Radio link failure BS approach link failure Timer expired Ciphering algorithm not supported Resource unavailable : Other values are reserved

9.2.2.11RR Cause

~~This fixed length element is passed from the radio interface to the CN transparently, when received in a RRC message.~~

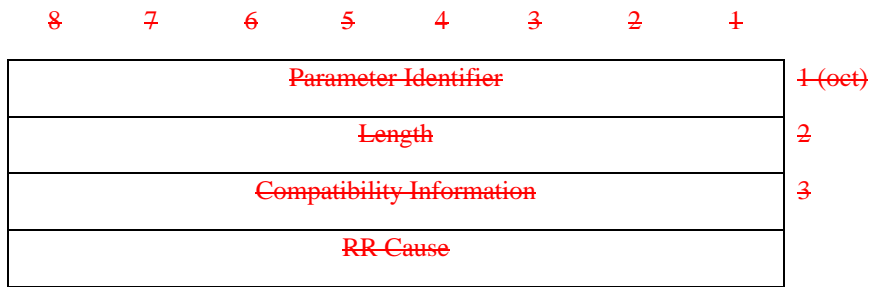


Figure 9.2.4.2-11 format of RR-Cause

Oct 2 is coded as the equivalent field from RRC protocol descriptor.

9.2.2.12 MS Classmark for RAN

This element defines attributes of the UE equipment in use on a RNC. It should be included Ciphering algorithm and Radio capability etc. (the detail is FFS.)

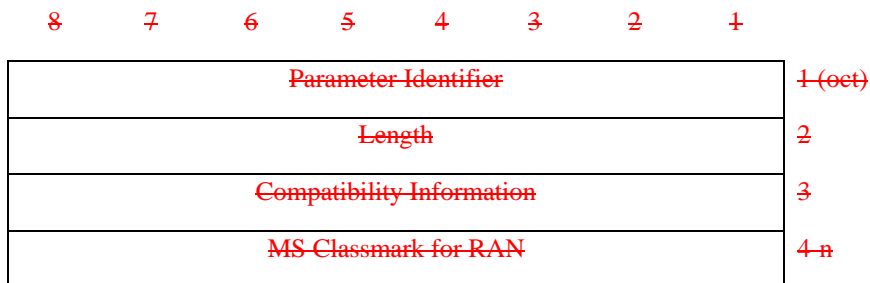


Figure 9.2.4.2-12 format of MS Classmark for RAN

9.2.2.13 Direct transfer Information

This element is included call control and mobility management messages, which transfer between the CN and the UE. The RNC is not interpreted this element.

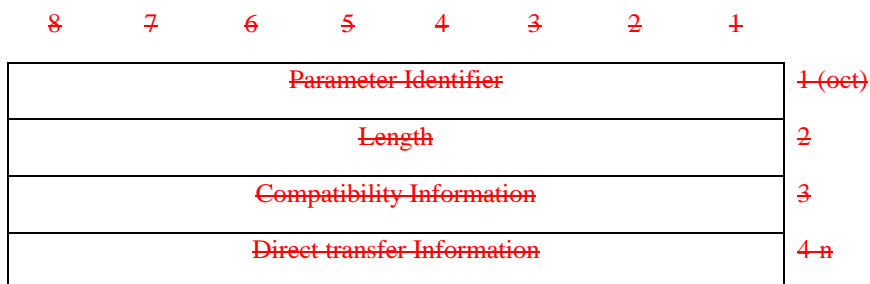
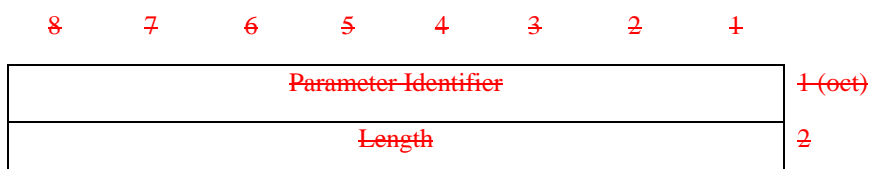


Figure 9.2.4.2-13 format of Direct transfer Information

9.2.2.14 Layer 3 Information

This variable element used to pass radio interface message one network entity to another.



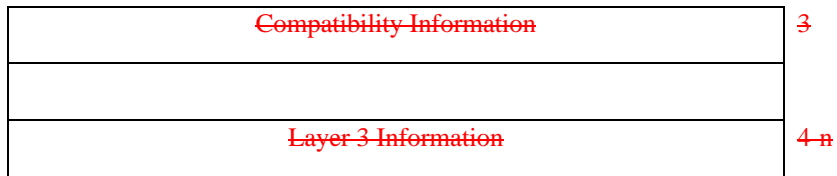


Figure 9.2.4.2-14 format of Layer 3 Information

9.2.2.15 IMUI

The IMUI is a variable length element, and include a length indicator. The remainder of this coded as defined in MM protocol description.

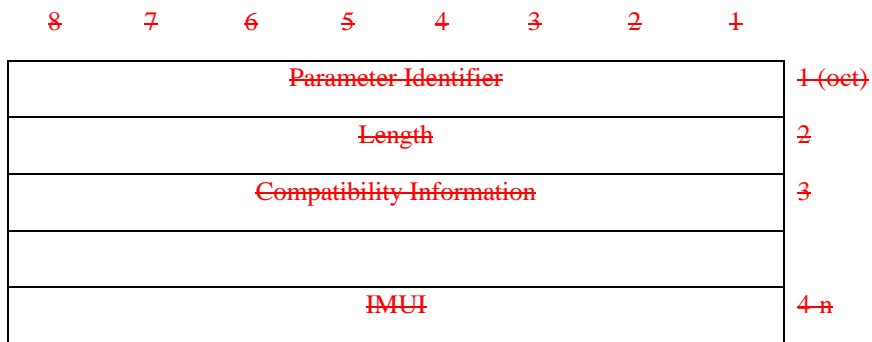


Figure 9.2.4.2-15 format of IMUI

9.2.2.16 TMUI

The TMUI is a fixed length element. The TMUI an unstructured number of 4 octets length.

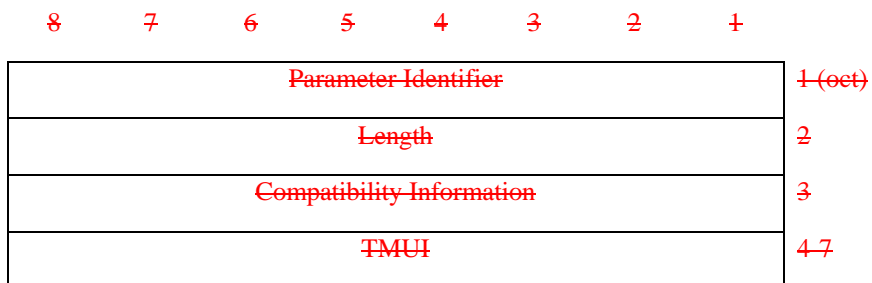


Figure 9.2.4.2-16 format of TMUI

9.2.2.17 Cipher Information

This element contains the cipher key.

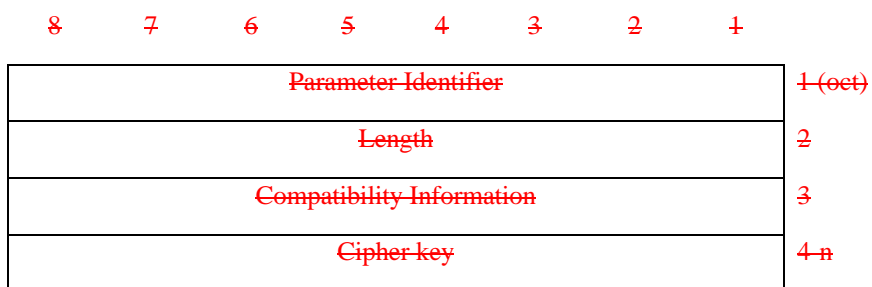


Figure 9.2.4.2-17 format of Cipher Information

9.2.2.18 Cell Identifier List

This element uniquely identifies cells and is of variable length containing:

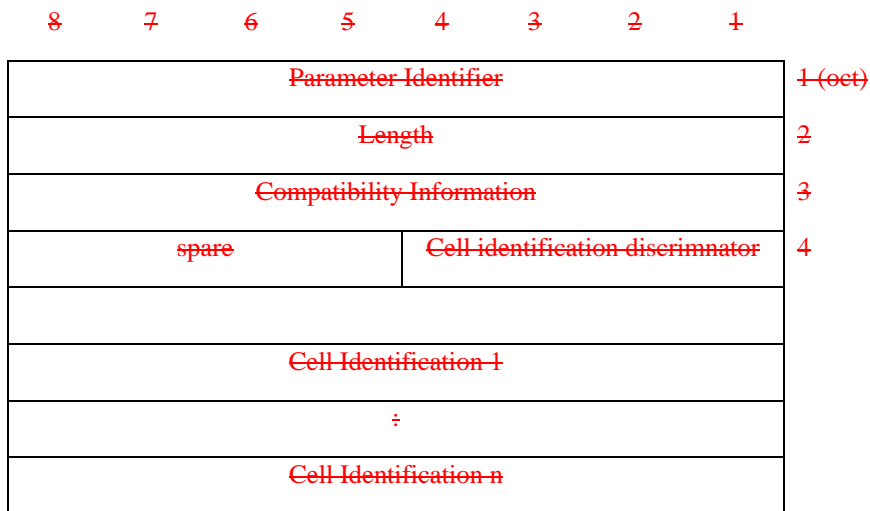


Figure 9.2.4.2-18 format of Cell Identifier List

9.2.2.19 Cell Identifier

This element uniquely identifies cell which a RNC and is of variable length containing:

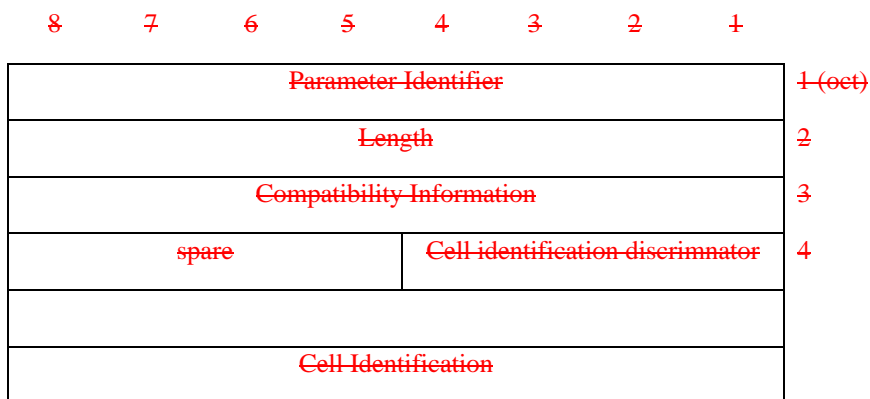


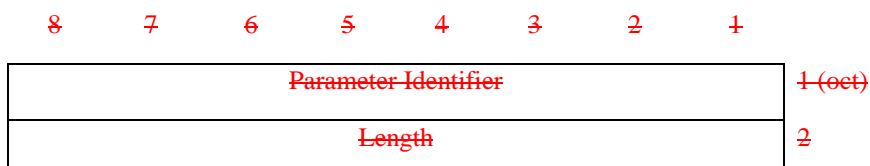
Figure 9.2.4.2-19 format of Cell Identifier

9.2.2.20 Chosen Channel

This element contains a description of the channel allocated for the call in the cell. (the detail is FFS.)

9.2.2.21 Cipher Response Mode

This information element is used by the CN to indicate whether the IMEI is to be included in the CIPHERING MODE COMPLETE message to be sent by the UE. (the detail is FFS.)



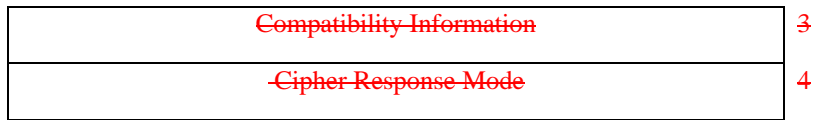


Figure 9.2.4.2 21 format of Cipher Response Mode

9.2.2.22 Chosen Cipher Algorithm

This information element indicates the cipher algorithm using by the RNC.

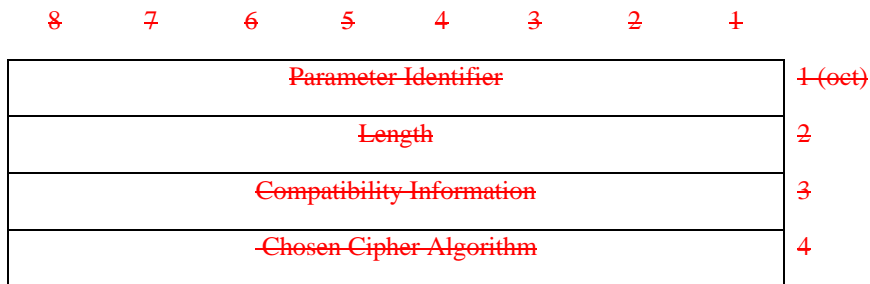


Figure 9.2.4.2 22 format of Chosen Cipher Algorithm

9.2.2.23 Group Call Reference

This element may be not used.

9.2.2.24 Talker Flag

This element may be not used.

9.2.2.25 Layer 3 Radio Information

This information element is used for forwarding the radio information, when it does not exist the Iur interface between the source RNC and the target RNC.

The RANAP should have not to analyze the contents.

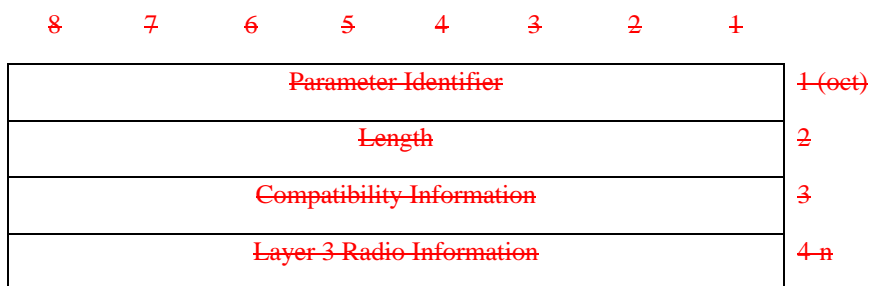


Figure 9.2.4.2 25 format of Layer 3 Radio Information

9.2.2.26 Response Request

The presence of this element indicates that a Handover Failure message is required by the RNC, if the Handover required message does not result in a handover. The necessity of this parameter is FFS.





Figure 9.2.4.2-26 format of Response Request

Message type

Message type uniquely identifies the message being sent. It is mandatory for all elements.

Radio Access Bearer ID

[Editor's note: This definition needs to be harmonized with UMTS 23.10.]

This ID is to identify a particular radio access bearer in Iu.

NAS Binding Information

[Editor's note: This definition needs to be harmonized with UMTS 23.10.]

This information is a information transmitted transparently to the RNC.

Bearer parameters

The purpose of the bearer parameter information element is to indicate all bearer parameters for both directions, e.g. Quality of service (QoS) classes.

Transport address

To be used for the user plane transport.

Iu transport association

This element is used to associate the bearer ID and the corresponding user plane connection.

Cause

The cause element is used to indicate the reason for a particular event to have occurred according to the cause code list.

Priority level and pre-emption indication

Indicates the priority of the request.

Bearer linking

A group of bearers which must be either all established, or all rejected.

Location Identifier

Indicates location of the UE.

Common ID

This ID is common for mobile terminal and is used by the RNC to check if SRB is already existing (from other NE) to the UE when new radio access bearer is in establishment phase.

CN Domain Indicator

Indicates to which domain (MSC or SGSN) the paging shall be directed.

IMSI

International Mobile Subscriber Identity, identifies a subscriber.

TMSI

Temporary Mobile Subscriber Identity, used for security reasons to hide the identity of a subscriber.

Paging Cause

Tells the cause of paging to the UE.

Trace Type

A fixed length element indicating the type of trace information to be recorded.

Trigger ID

A variable length element indicating the identity of the entity which initiated the trace.

Trace Reference

A fixed length element providing a trace reference number allocated by the triggering entity.

UE Identity

Indicates the identity of the UE.

OMC ID

A variable length element indicating the destination OMC to which trace information is to be sent.

Encryption Information

This element contains the user data encryption information (key(s) and permitted algorithms) used to control any encryption equipment at the RNC.

Chosen Encryption Algorithm

This element indicates the encryption algorithm being used by the RNC.

NAS Bit String

The NAS information to be broadcast. The internal structure of this bit string is not known or analysed by the RNC, and is specified as part of the CN - UE protocols.

Broadcast Area

With each bit string, a geographical area where to broadcast it.

Categorisation parameters

With each bit string, to be used by the RNC to determine how to schedule the repetition cycle.

NAS PDU

This information element contains the CN -UE or UE -CN message that is transferred without interpretation in the RNC. Typically it contains call control and mobility management messages.

Request Type

[Editor's note: This definition needs to be harmonized with UMTS 23.10.]

This information request the information type that to be reported from RNC, e.g. to report LAI and RAI of the current UE location. Other request types are FFS.

Location Information

[Editor's note: This definition needs to be harmonized with UMTS 23.10.]

This information shows the location information that has been requested by the CN, e.g. LAI and RAI. Other types of location information are FFS.

NAS Layer 3 Information

This is a variable length element used to pass radio interface messages from one network entity to another.

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

```

-- *****
--
-- PDU descriptions for RANAP.
--
-- *****

RANAP-PDU-descriptions -- { object identifier to be allocated }--
DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- PDU content types from the PDU module.
--
-- *****

IMPORTS
-- Imports PDU content types from RANAP PDU contents module
-- ** TO BE DEFINED **
    ExampleMessageContents1,
    ExampleMessageContents2-v1,
    ExampleMessageContents2-v2,
    ExampleMessageContents3
FROM RANAP-PDU-contents;

-- *****
--
-- Table column structure.
--
-- RANAP-PDU-DESCR associates a RANAP PDU structure with a PDU
-- identifier.
--
-- *****

RANAP-PDU-DESCR ::= CLASS {
    &PDUType,
    &versionID   VersionID   UNIQUE,
    &compatibilityInformation CompatibilityInformation,
    &LogicalProcedure LogicalProcedure
}
WITH SYNTAX {
    PDU TYPE      &PDUType
    VERSION NUMBER AND ID   &versionID
    COMPATIBILITY INFORMATION &compatibilityInformation
    LOGICAL PROCEDURE      &LogicalProcedure
}

-- ** TO BE DEFINED **
VersionID ::= SEQUENCE {
    pduID      INTEGER (0..63),
    versionNumber   VersionNumber
}

```

```

-- *** TO BE DEFINED ***
VersionNumber ::= INTEGER (1 .. 255)

-- *** TO BE DEFINED ***
CompatibilityInformation ::= ENUMERATED {
  releaseIndicator,
  sendNotify,
  discardMessages,
  ...
}

-- *** TO BE DEFINED ***
LogicalProcedure ::= ENUMERATED {
  gLOBAL,
  DEDICATED
}

-- *****
--
-- Table row definitions.
--
-- RANAP PDU descriptions.
--
-- *****

RANAP-PDUs RANAP-PDU-DESCR ::= {
  -- *** TO BE DEFINED ***
  exampleMessage1 |
  exampleMessage2-v1 |
  exampleMessage2-v2 |
  exampleMessage3 |

  -- Additional PDU descriptions can be added in future
  ...
}

-- *** TO BE DEFINED ***
exampleMessage1 RANAP-PDU-DESCR ::= {
  PDU TYPE      ExampleMessageContents1
  VERSION NUMBER AND ID { pduID 1, versionNumber 1 }
  COMPATIBILITY INFORMATION sendNotify
  LOGICAL PROCEDURE { gLOBAL }
}

exampleMessage2-v1 RANAP-PDU-DESCR ::= {
  PDU TYPE      ExampleMessageContents2-v1
  VERSION NUMBER AND ID { pduID 2, versionNumber 1 }
  COMPATIBILITY INFORMATION releaseIndicator
  LOGICAL PROCEDURE { DEDICATED }
}

exampleMessage2-v2 RANAP-PDU-DESCR ::= {
  PDU TYPE      ExampleMessageContents2-v2
  VERSION NUMBER AND ID { pduID 2, versionNumber 2 }
  COMPATIBILITY INFORMATION releaseIndicator
  LOGICAL PROCEDURE { DEDICATED }
}

exampleMessage3 RANAP-PDU-DESCR ::= {
  PDU TYPE      ExampleMessageContents3
  VERSION NUMBER AND ID { pduID 3, versionNumber 1 }
  COMPATIBILITY INFORMATION discardMessages
  LOGICAL PROCEDURE { gLOBAL | DEDICATED }
}

-- *****
--
-- Generic PDU structure. The RANAP-PDUs table above describes
-- valid contents for the vid, indication and value fields.
--
-- *****

RANAP-PDU ::= SEQUENCE {
  vid      RANAP-PDU-DESCR.&versionID      ( {RANAP-PDUs} ),
  indication RANAP-PDU-DESCR.&compatibilityInformation ( {RANAP-PDUs}@vid ),
  value     RANAP-PDU-DESCR.&PDUType        ( {RANAP-PDUs}@vid )
}

END

```

```

-- *****
--
-- RANAP PDU content definitions
--
-- *****

RANAP-PDU-contents DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

-- *** TO BE DEFINED ***
FROM RANAP-IEs;

-- *** TO BE DEFINED ***
FROM RANAP-Constants;

-- Definitions of RANAP PDU content types one by one
-- *** TO BE DEFINED ***

ExampleMessageContents1 ::= SEQUENCE {
    -- *** IEs to be defined ***
    ...
}

ExampleMessageContents2-v1 ::= SEQUENCE {
    -- *** IEs to be defined ***
    ...
}

ExampleMessageContents2-v2 ::= SEQUENCE {
    -- *** IEs to be defined ***
    ...
}

ExampleMessageContents3 ::= SEQUENCE {
    -- *** IEs to be defined ***
    ...
}

END

```

```

-- *****
--
-- RANAP Information Elements
--
-- *****

RANAP-IEs DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

-- *** TO BE DEFINED ***
FROM RANAP-Constants;

-- Definitions of RANAP IEs one by one
-- *** TO BE DEFINED ***

END

```

```

-- *****
--
-- Constant definitions for RANAP
--
-- *****

RANAP-Constants DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- Definitions of RANAP constants one by one
-- *** TO BE DEFINED ***

```

END

9.4 Message transfer syntax

9.5 Timers

[Editor's note: This chapter should list and describe the used timers.]

10 Handling of unknown, unforeseen and erroneous protocol data

11 Annex A (normative):

Annex A Document Stability Assessment Table

<u>Section</u>	<u>Content missing</u>	<u>Incomplete</u>	<u>Restructuring needed</u>	<u>Checking needed</u>	<u>Editorial work required</u>	<u>Finalisation needed</u>	<u>Almost stable</u>	<u>Stable</u>
<u>1</u>	√							
<u>2</u>					√			
<u>3</u>				√				
<u>4</u>	√							
<u>5</u>	√							
<u>6</u>	√							
<u>7</u>	√							
<u>8</u>						√		
<u>9</u>		√			√			
<u>10</u>	√							

12 History

Document history		
0.0.1	February 1999	Document skeleton created.
0.0.2	February 1999	Relevant sections from Merged "Description of Iu Interface" have been introduced.
0.0.3	March 1999	The results of the solved study items Iu/2, Iu/3, Iu/4 and Iu/6 have been updated to the text. The heading of section 8 has been changed to "RANAP procedures".
0.0.4	April 1999	Editorial changes: <ul style="list-style-type: none"> - References to "Merged Description of Iu Interface" have been removed. - Remaining instances of Signalling Channel Setup and Response procedure have been removed. - In Hard HO procedure it has been corrected that target RNC receives RELOCATION COMMIT message from source RNC.
0.0.5	April 1999	Editorial changes: <ul style="list-style-type: none"> - Words "Radio Access", related to radio access bearer setup, reconfiguration and release messages, have been added in front of those messages where it was missing. - RAB Release procedure updated to return RAB ASSIGNMENT COMPLETE message before User plane release.
0.1.0	April 1999	Same as 0.0.5, approved by WG3.
1.0.0	April 1999	Approved by TSG RAN. Same contents as 0.1.0.
1.0.1	May 1999	Main updates made based on WG3 meeting #3 and other decisions: <ul style="list-style-type: none"> • Specification number changed to UMTS 25.413. • Title changed to UTRAN Iu Interface RANAP Signalling. • SRNS Relocation and Inter RNS Hard HO procedures merged to a Relocation procedure with a split to elementary procedures according to Tdoc R3-99339 with agreed modifications. The merging was possible based on the approved Tdoc R3-99340, which added RELOCATION DETECT message to the SRNS Relocation procedure. • A statement in the Relocation procedure added related to the load sharing on the Iu-PS interface, according to Tdoc R3-99257 with modifications. • Location Request and Location Report procedures added according to Tdoc R3-99358 with agreed modifications. • Information elements for Relocation procedure have been added according to Tdoc R3-99328 with modifications.

1.0.2	June 1999	<p>Main updates made based on WG3 meeting #4 decisions:</p> <ul style="list-style-type: none"> • Relocation Required Indication procedure replaced by Relocation Preparation procedure according to R3-99477 with agreed modifications. • It was decided to use combined RAB Assignment procedure based on solved Study item Iu/5. • Location Request procedure was replaced by Location Reporting Control procedure according to R3-99475 with agreed modifications. • RANAP Error Indication procedure was introduced according to R3-99456. • CN domain indicator to Paging procedure was accepted according to R3-99461. • Information elements for RAB Assignment procedure were agreed according to R3-99503 with modifications. • Some minor editorial changes made.
<u>1.1.0</u>	<u>July 1999</u>	<u>Same as v. 1.0.2 approved in RAN WG3 and raised to v. 1.1.0.</u>
<u>1.1.1.</u>	<u>July 1999</u>	<p><u>Main updates made based on WG3 meeting #5 decisions:</u></p> <ul style="list-style-type: none"> • <u>Description and definition of elementary procedure added according to R3-99727 with modifications. List of elementary procedures included.</u> • <u>As a result of R3-99727, Iu Release Request changed to an elementary procedure. Text proposed by the Editor.</u> • <u>Failure handling added to Relocation procedure based on R3-99746 with modifications.</u> • <u>Relocation cancel elementary procedure added according to R3-99745 with modifications.</u> • <u>Bearer ID changed to RAB ID and NAS Binding ID added according to R3-99747.</u> • <u>User Plane Mode parameter added to RAB Assignment and Relocation procedures according to R3-99720.</u> • <u>The Cause parameter added and Transparent field changed to mandatory in RELOCATION REQUIRED and RELOCATION REQUEST messages according to R3-99678.</u> • <u>The parameters for Location Reporting Control and Location Report procedures were agreed according to R3-99748.</u> • <u>The message contents for the remaining procedures and parameter definitions added based on R3-99670 with modifications.</u>
<u>1.1.2</u>	<u>August 1999</u>	<u>'Cause' parameter removed from Overload procedure description. Minor editorial changes.</u>

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