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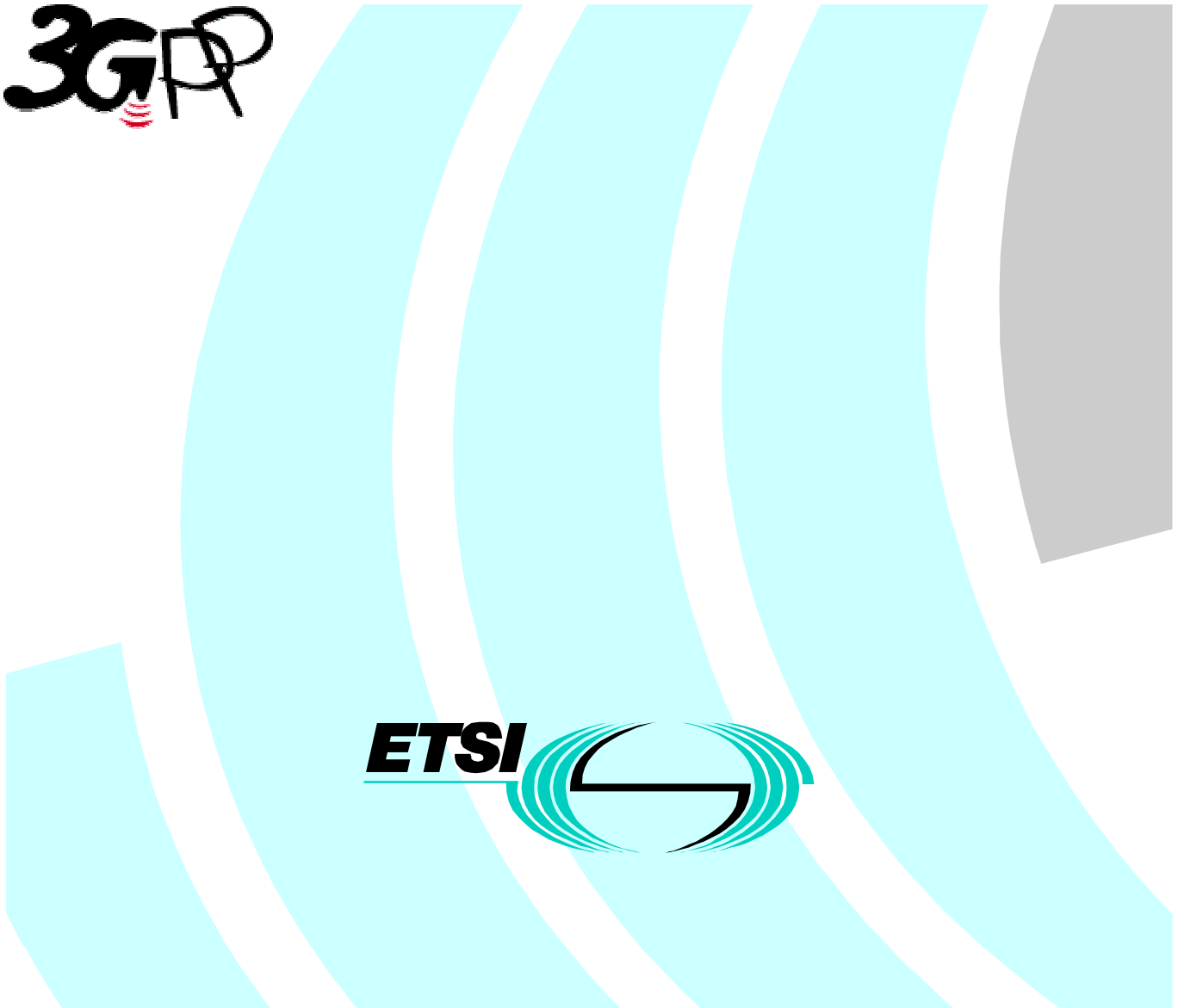
Technical Specification

Universal Mobile Telecommunications System (UMTS);
UTRAN Iu Interface RANAP Signalling
(3GPP TS 25.413 version 3.4.0 Release 1999)



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Foreword

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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:

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where:

- x the first digit:
  - 1 presented to TSG for information;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
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1 Scope

The present document specifies the radio network layer signalling protocol called Radio Access Network Application Part (RANAP) for the Iu interface. RANAP supports the functions of Iu interface by signalling procedures defined in this document. RANAP is developed in accordance to the general principles stated in [1], [2] and [3].

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".

[1] 3GPP TR 23.930: "3rd Generation Partnership Project (3GPP) Technical Specification Group Services and System Aspects; Iu Principles".

[2] 3GPP TS 25.410: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; UTRAN Iu Interface: General Aspects and Principles".

[3] 3GPP TS 25.401: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; UTRAN Overall Description".

[4] 3GPP TR 25.931: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; UTRAN Functions, Examples on Signalling Procedures".

[5] 3GPP TS 25.412: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; UTRAN Iu Interface Signalling Transport".

[6] 3GPP TS 25.415: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; UTRAN Iu Interface User Plane Protocols".

[7] 3GPP TS 23.107: "3rd Generation Partnership Project (3GPP) Technical Specification Group Services and System Aspects; QoS Concept and Architecture".

[8] 3GPP TS 24.008: "3rd Generation Partnership Project (3GPP); Mobile radio interface layer 3 specification, Core Network Protocols – Stage 3".

[9] 3GPP TS 25.414: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; Iu Interface Data Transport and Transport Signalling".

[10] 3GPP TS 25.331: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; RRC Protocol Specification".

[11] 3GPP TS 08.08: "Mobile services Switching Centre – Base Station System (MSC – BSS) interface".

[12] 3GPP TS 12.08: "Subscriber and equipment trace".

[13] X.691 (12/94): "Information Technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".

[14] X.680, (12/94): "Information Technology - Abstract Syntax Notation One (ASN.1):Specification of basic notation".

[15] X.681 (12/94): "Information Technology - Abstract Syntax Notation One (ASN.1): Information object specification".

[16] 3GPP TS 23.110: "3rd Generation Partnership Project (3GPP) Technical Specification Group Services and System Aspects, UMTS Access Stratum, Services and Functions".

[17] 3GPP TS 25.323: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; Packet Data Convergence Protocol (PDCP) Specification".

[18] 3GPP TS 25.921: "3rd Generation Partnership Project (3GPP) Technical Specification Group Radio Access Network; Guidelines and principles for protocol description and error handling".

[19] 3GPP TS 23.003: "3rd Generation Partnership Project (3GPP) Technical Specification Group Core Network; Numbering, addressing and identification".

[20] 3GPP TS 23.032: "3rd Generation Partnership Project (3GPP) Technical Specification Group Core Network; Universal Geographical Area Description (GAD)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Relocation of SRNS: relocation of SRNS is a UMTS functionality used to relocate the serving RNS role from one RNS to another RNS. This UMTS functionality is realised by several elementary procedures executed in several interfaces and by several protocols and it may involve a change in the radio resources used between UTRAN and UE

It is also possible to relocate the serving RNS role from:

- one RNS within UMTS to another relocation target external to UMTS;
- functionality equivalent to the serving RNS role from another relocation source external to UMTS to another RNS.

Serving RNS (SRNS): role an RNS can take with respect to a specific connection between an UE and UTRAN. There is one serving RNS for each UE that has a connection to UTRAN. The serving RNS is in charge of the radio connection between a UE and the UTRAN. The serving RNS terminates the Iu for this UE

Serving RNC (SRNC): SRNC is the RNC belonging to SRNS

SRNC-ID: see [3] for definition

S-RNTI: see [3] for definition

Source RNS: role, with respect to a specific connection between UTRAN and CN, that RNS takes when it decides to initiate a relocation of SRNS

Source RNC: source RNC is the RNC belonging to source RNS

Target RNS: role an RNS gets with respect to a specific connection between UTRAN and CN when it is being a subject of a relocation of SRNS which is being made towards that RNS

Target RNC: target RNC is the RNC belonging to target RNS

Directed retry: Directed retry is the process of assigning a User Equipment to a radio resource that does not belong to the serving RNC e.g. in situations of congestion. It is triggered by the RAB Assignment procedure and employs relocation procedures.

Elementary Procedure: RANAP protocol consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between the RNS and the CN. These Elementary Procedures are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as stand alone procedures, which can be active in parallel. Examples on using several RANAP EPs together with each other and EPs from other interfaces can be found in reference [4].

An EP consists of an initiating message and possibly a response message. Three kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success and/or failure).
- **Class 2:** Elementary Procedures without response.
- **Class 3:** Elementary Procedures with possibility of multiple responses.

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.

Unsuccessful:

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

Successful and Unsuccessful:

- One signalling message reports both successful and unsuccessful outcome for the different included requests.

Class 2 EPs are considered always successful.

Class 3 EPs have one or several response messages reporting both successful, unsuccessful outcome of the requests and temporary status information about the requests. This type of EP only terminates through response(s) or EP timer expiry.

3.2 Symbols

Void.

3.3 Abbreviations

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

AAL2	ATM Adaptation Layer type 2
AS	Access Stratum
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
CC	Call Control
CN	Core Network
CRNC	Controlling RNC
CS	Circuit Switched
DCH	Dedicated Channel
DL	Downlink
DRNC	Drift RNC
DRNS	Drift RNS
DSCH	Downlink Shared Channel
EP	Elementary Procedure
GPRS	General Packet Radio System
GTP	GPRS Tunnelling Protocol
IE	Information Element
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IPv4	Internet Protocol (version 4)
IPv6	Internet Protocol (version 6)
MM	Mobility Management
MSC	Mobile services Switching Center
NAS	Non Access Stratum

N-PDU	Network – Protocol Data Unit
OSP:IHOSS	Octet Stream Protocol: Internet-Hosted Octet Stream Service
P-TMSI	Packet TMSI
PDCP	Packet Data Convergence Protocol
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
PS	Packet Switched
QoS	Quality of Service
RAB	Radio Access Bearer
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RRC	Radio Resource Control
SAI	Service Area Identifier
SAP	Service Access Point
SCCP	Signalling Connection Control Part
SDU	Service Data Unit
SGSN	Serving GPRS Support Node
SRNC	Serving RNC
SRNS	Serving RNS
TEID	Tunnel Endpoint Identifier
TMSI	Temporary Mobile Subscriber Identity
UE	User Equipment
UEA	UMTS Encryption Algorithm
UIA	UMTS Integrity Algorithm
UL	Uplink
UMTS	Universal Mobile Telecommunications System
USCH	Uplink Shared Channel
UTRAN	UMTS Terrestrial Radio Access Network

4 General

4.1 Procedure Specification Principles

The principle for specifying the procedure logic is to specify the functional behaviour of the RNC exactly and completely. The CN functional behaviour is left unspecified. The EPs Relocation Preparation, Reset, Reset Resource and Overload Control are exceptions from this principle.

The following specification principles have been applied for the procedure text in chapter 8:

- The procedure text discriminates between:

  1) Functionality which "shall" be executed

     The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 of Class 3 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

  2) Functionality which "shall, if supported" be executed

     The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included.

4.2 Forwards and Backwards Compatibility

The forwards and backwards compatibility of the protocol is assured by mechanism where all current and future messages, and IEs or groups of related IEs, include ID and criticality fields that are coded in a standard format that will not be changed in the future. These parts can always be decoded regardless of the standard version.

4.3 Specification Notations

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

Procedure	When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. RAB Assignment procedure.
Message	When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. RAB ASSIGNMENT REQUEST message.
IE	When referring to an information element (IE) in the specification the *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *User Plane Mode* IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in subclause 9.2 enclosed by quotation marks, e.g. "Abstract Syntax Error (Reject)" or "Geographical Coordinates ".

5 RANAP Services

RANAP provides the signalling service between UTRAN and CN that is required to fulfil the RANAP functions described in clause 7. RANAP services are divided into three groups based on Service Access Points (SAP) defined in [16]:

1. General control services: They are related to the whole Iu interface instance between RNC and logical CN domain, and are accessed in CN through the General Control SAP. They utilise connectionless signalling transport provided by the Iu signalling bearer.

2. Notification services: They are related to specified UEs or all UEs in specified area, and are accessed in CN through the Notification SAP. They utilise connectionless signalling transport provided by the Iu signalling bearer.

3. Dedicated control services: They are related to one UE, and are accessed in CN through the Dedicated Control SAP. RANAP functions that provide these services are associated with Iu signalling connection that is maintained for the UE in question. The Iu signalling connection is realised with connection oriented signalling transport provided by the Iu signalling bearer.

6 Services Expected from Signalling Transport

Signalling transport (ref. [5]) shall provide two different service modes for the RANAP.

1. Connection oriented data transfer service. This service is supported by a signalling connection between RNC and CN domain. It shall be possible to dynamically establish and release signalling connections based on the need. Each active UE shall have its own signalling connection. The signalling connection shall provide in sequence delivery of RANAP messages. RANAP shall be notified if the signalling connection breaks.

2. Connectionless data transfer service. RANAP shall be notified in case a RANAP message did not reach the intended peer RANAP entity.

7 Functions of RANAP

RANAP protocol has the following functions:

- Relocating serving RNC. This function enables to change the serving RNC functionality as well as the related Iu resources (RAB(s) and Signalling connection) from one RNC to another.
- Overall RAB management. This function is responsible for setting up, modifying and releasing RABs.
- Queuing the setup of RAB. The purpose of this function is to allow placing some requested RABs into a queue, and indicate the peer entity about the queuing.
- Requesting RAB release. While the overall RAB management is a function of the CN, the RNC has the capability to request the release of RAB.
- Release of all Iu connection resources. This function is used to explicitly release all resources related to one Iu connection.
- Requesting the release of all Iu connection resources. While the Iu release is managed from the CN, the RNC has the capability to request the release of all Iu connection resources from the corresponding Iu connection.
- SRNS context forwarding function. This function is responsible for transferring SRNS context from the RNC to the CN for intersystem forward handover in case of packet forwarding.
- Controlling overload in the Iu interface. This function allows adjusting the load in the Iu interface.
- Resetting the Iu. This function is used for resetting an Iu interface.
- Sending the UE Common ID (permanent NAS UE identity) to the RNC. This function makes the RNC aware of the UE's Common ID.
- Paging the user. This function provides the CN for capability to page the UE.
- Controlling the tracing of the UE activity. This function allows setting the trace mode for a given UE. This function also allows the deactivation of a previously established trace.
- Transport of NAS information between UE and CN (ref. [8]). This function has three sub-classes:
    1. Transport of the initial NAS signalling message from the UE to CN. This function transfers transparently the NAS information. As a consequence also the Iu signalling connection is set up.
    2. Transport of NAS signalling messages between UE and CN, This function transfers transparently the NAS signalling messages on the existing Iu signalling connection. It also includes a specific service to handle signalling messages differently.
- Controlling the security mode in the UTRAN. This function is used to send the security keys (ciphering and integrity protection) to the UTRAN, and setting the operation mode for security functions.
- Controlling location reporting. This function allows the CN to operate the mode in which the UTRAN reports the location of the UE.
- Location reporting. This function is used for transferring the actual location information from RNC to the CN.
- Data volume reporting function. This function is responsible for reporting unsuccessfully transmitted DL data volume over UTRAN for specific RABs.
- Reporting general error situations. This function allows reporting of general error situations, for which function specific error messages have not been defined.

These functions are implemented by one or several RANAP elementary procedures described in the following clause.

8 RANAP Procedures

8.1 Elementary Procedures

In the following tables, all EPs are divided into Class 1, Class 2 and Class 3 EPs (see subclause 3.1 for explanation of the different classes):

Table 1: Class 1

Elementary Procedure	Initiating Message	Successful Outcome	Unsuccessful Outcome
		Response message	Response message
Iu Release	IU RELEASE COMMAND	IU RELEASE COMPLETE	
Relocation Preparation	RELOCATION REQUIRED	RELOCATION COMMAND	RELOCATION PREPARATION FAILURE
Relocation Resource Allocation	RELOCATION REQUEST	RELOCATION REQUEST ACKNOWLEDGE	RELOCATION FAILURE
Relocation Cancel	RELOCATION CANCEL	RELOCATION CANCEL ACKNOWLEDGE	
SRNS Context Transfer	SRNS CONTEXT REQUEST	SRNS CONTEXT RESPONSE	
Security Mode Control	SECURITY MODE COMMAND	SECURITY MODE COMPLETE	SECURITY MODE REJECT
Data Volume Report	DATA VOLUME REPORT REQUEST	DATA VOLUME REPORT	
Reset	RESET	RESET ACKNOWLEDGE	
Reset Resource	RESET RESOURCE	RESET RESOURCE ACKNOWLEDGE	

Table 2: Class 2

Elementary Procedure	Message
RAB Release Request	RAB RELEASE REQUEST
Iu Release Request	IU RELEASE REQUEST
Relocation Detect	RELOCATION DETECT
Relocation Complete	RELOCATION COMPLETE
SRNS Data Forwarding Initiation	SRNS DATA FORWARD COMMAND
SRNS Context Forwarding from Source RNC to CN	FORWARD SRNS CONTEXT
SRNS Context Forwarding to Target RNC from CN	FORWARD SRNS CONTEXT
Paging	PAGING
Common ID	COMMON ID
CN Invoke Trace	CN INVOKE TRACE
CN Deactivate Trace	CN DEACTIVATE TRACE
Location Reporting Control	LOCATION REPORTING CONTROL
Location Report	LOCATION REPORT
Initial UE Message	INITIAL UE MESSAGE
Direct Transfer	DIRECT TRANSFER
Overload Control	OVERLOAD
Error Indication	ERROR INDICATION

Table 3: Class 3

Elementary Procedure	Initiating Message	Response Message
RAB Assignment	RAB ASSIGNMENT REQUEST	RAB ASSIGNMENT RESPONSE x N (N>=1)

The following applies concerning interference between Elementary Procedures:

- The Reset procedure takes precedence over all other EPs.
- The Reset Resource procedure takes precedence over all other EPs except the Reset procedure.
- The Iu Release procedure takes precedence over all other EPs except the Reset procedure and the Reset Resource procedure.

8.2 RAB Assignment

8.2.1 General

The purpose of the RAB Assignment procedure is to establish new RABs and/or to enable modifications and/or releases of already established RABs for a given UE. The procedure uses connection oriented signalling.

8.2.2 Successful Operation

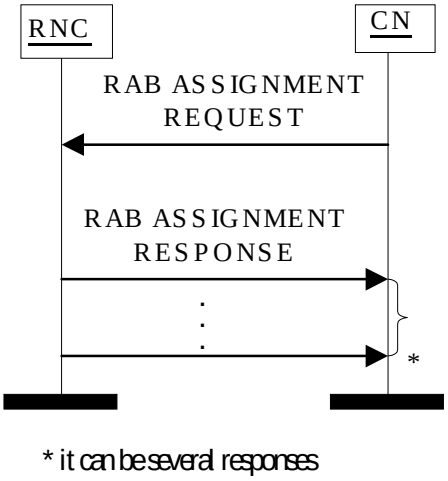

Figure 1: RAB Assignment procedure. Successful operation.

The CN shall initiate the procedure by sending a RAB ASSIGNMENT REQUEST message. When sending the RAB ASSIGNMENT REQUEST message, the CN shall start the $T_{RABAssgt}$ timer.

The CN may request UTRAN to:

- establish,
- modify,
- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The message shall contain the information required by the UTRAN to build the new RAB configuration, such as:

- list of RABs to establish or modify with their bearer characteristics;
- list of RABs to release.

For each RAB requested to establish, the message shall contain:

- RAB ID.
- RAB parameters (including e.g. Allocation/Retention Priority).
- User Plane Mode Information (i e User Plane Mode and UP Mode Versions).

- Transport Layer Address.
- Iu Transport Association.
- PDP Type Information (only for PS)
- Data Volume Reporting Indication (only for PS).
- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of handover from GPRS to UMTS or when establishing a RAB for an existing PDP context).
- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of handover from GPRS to UMTS or when establishing a RAB for an existing PDP context).
- DL N-PDU sequence number (only when N-PDU sequence number is available in case of handover from GPRS to UMTS).
- UL N-PDU sequence number (only when N-PDU sequence number is available in case of handover from GPRS to UMTS).

For each RAB requested to modify, the message may contain:

- RAB ID (mandatory).
- NAS Synchronisation Indicator.
- RAB parameters.
- Transport Layer Address.
- Iu Transport Association.

For each RAB request to release, the message shall contain:

- RAB ID.
- Cause.

Upon reception of the RAB ASSIGNMENT REQUEST message UTRAN shall execute the requested RAB configuration.

The RAB ID shall identify uniquely the RAB for the specific CN domain for the particular UE, which makes the RAB ID unique over the Iu connection on which the RAB ASSIGNMENT REQUEST message is received. When a RAB ID already in use over that particular Iu instance is used, the procedure is considered as modification of that RAB.

The RNC shall pass the contents of *RAB ID* IE to the radio interface protocol for each RAB requested to establish or modify.

The RNC shall establish or modify the resources according to the values of the *Allocation/Retention Priority* IE (priority level, pre-emption indicators, queuing) and the resource situation as follows:

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.
- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.
- The priority levels and the pre-emption indicators may (singularly or in combination) be used to determine whether the RAB assignment has to be performed unconditionally and immediately. If the requested RAB is marked as "may trigger pre-emption" and the resource situation so requires, RNC may trigger the pre-emption procedure which may then cause the forced release of a lower priority RAB which is marked as "pre-emptable". Whilst the process and the extent of the pre-emption procedure is operator dependent, the pre-emption indicators, if given in the RAB ASSIGNMENT REQUEST message, shall be treated as follows:

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.
  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

3. If the *Pre-emption Capability* IE is set to "shall not trigger pre-emption", then this allocation request shall not trigger the pre-emption procedure.

4. If the *Pre-emption Vulnerability* IE is set to "pre-emptable", then this connection shall be included in the pre-emption process.

5. If the *Pre-emption Vulnerability* IE is set to "not pre-emptable", then this connection shall not be included in the pre-emption process.

6. If the *Priority Level* IE is set to "no priority used" the given values for the *Pre-emption Capability* IE and *Pre-emption Vulnerability* IE shall not be considered. Instead the values "shall not trigger pre-emption" and "not pre-emptable" shall prevail.

- If the *Allocation/Retention Priority* IE is not given in the RAB ASSIGNMENT REQUEST message, the allocation request shall not trigger the pre-emption process and the connection may be pre-empted and considered to have the value "lowest" as priority level. Moreover, queuing shall not be allowed.

- The UTRAN pre-emption process shall keep the following rules:

  1. UTRAN shall only pre-empt RABs with lower priority, in ascending order of priority.

  2. The pre-emption may be done for RABs belonging to the same UE or to other UEs.

If the *NAS Synchronisation Indicator* IE is contained in the RAB ASSIGNMENT REQUEST message, the RNC shall pass it to the radio interface protocol for the transfer to the UE.

If the RAB ASSIGNMENT REQUEST message includes the *PDP Type Information* IE, the UTRAN may use this to configure any compression algorithms.

If the *Service Handover* IE is included, this tells if the RAB

- should be handed over to GSM, i.e. from NAS point of view, the RAB should be handed over to GSM as soon as possible although the final decision whether to perform a handover to GSM is still made in UTRAN.

- should not be handed over to GSM, i.e. from NAS point of view, the RAB should remain in UMTS as long as possible although the final decision whether to perform a handover to GSM is still made in UTRAN.

- shall not be handed over to GSM, i.e. the RAB shall never be handed over to GSM. This means that UTRAN shall not initiate handover to GSM for the UE unless the RABs with this indication have first been released with the normal release procedures.

The value of the *Service Handover* IE is valid throughout the lifetime of the RAB or until changed by a RAB modification.

The *Service Handover* IE shall only influence decisions made regarding UTRAN initiated handovers.

If the *Service Handover* IE is not included, the decision whether to perform a handover to GSM is only an internal UTRAN matter.

UTRAN shall report to CN, in the first RAB ASSIGNMENT RESPONSE message, the result for all the requested RABs, such as:

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

UTRAN shall report the outcome of a specific RAB to establish or modify only after the transport network control plane signalling, which is needed for RAB establishment or modification, has been executed. The transport network control plane signalling shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification, it is up to the RNC to decide if any transport network control plane signalling shall be performed for the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE or if the already existing transport bearer shall be used. If the RNC decides to establish a new transport bearer, then the switch over to this

new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode.

Before reporting the outcome of a specific RAB to establish or modify, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. This initialisation is described in ref.[6].

In case of establishment of a RAB for the PS domain, the CN must be prepared to receive user data before the RAB ASSIGNMENT RESPONSE message has been received.

If none of the RABs have been queued, the CN shall stop timer $T_{RABAssgt.}$ And the RAB Assignment procedure terminates. In that case, the procedure shall also be terminated in UTRAN.

When the request to establish or modify one or several RABs is put in the queue, UTRAN shall start the timer $T_{QUEUING}$. This timer specifies the maximum time for queuing of the request of establishment or modification. The same timer $T_{QUEUING}$ is supervising all RABs being queued.

For each RAB that is queued the following outcomes shall be possible:

- successfully established or modified;
- failed to establish or modify;
- failed due to expiry of the timer $T_{QUEUING}$.

For the queued RABs, indicated in the first RAB ASSIGNMENT RESPONSE message, UTRAN shall report the outcome of the queuing for every RAB individually or for several RABs in subsequent RAB ASSIGNMENT RESPONSE message(s). This is left to implementation. UTRAN shall stop $T_{QUEUING}$ when all RABs have been either successfully established or modified or failed to establish or modify. The RAB Assignment procedure is then terminated both in CN and UTRAN when all RABs have been responded to.

When CN receives the response that one or several RABs are queued, CN shall expect UTRAN to provide the outcome of the queuing function for each RAB before expiry of the $T_{RABAssgt}$ timer. In case the timer $T_{RABAssgt}$ expires, the CN shall consider the RAB Assignment procedure terminated and the RABs not reported shall be considered as failed.

In the case the timer $T_{QUEUING}$ expires, the RAB Assignment procedure terminates in UTRAN for all queued RABs, and UTRAN shall respond for all of them in one RAB ASSIGNMENT RESPONSE message. The RAB Assignment procedure shall also be terminated in CN.

In case a request to modify or release a RAB contains the RAB ID of a RAB being queued, the RAB shall be taken out of the queue and treated according to the second request. The first request shall be responded to as a RAB failed to setup or modify with the cause value "Request superseded".

When UTRAN reports unsuccessful establishment/modification of a RAB, the cause value should be precise enough to enable the core network to know the reason for unsuccessful establishment/modification. Typical cause values are: "Requested Traffic Class not Available", "Invalid RAB Parameters Value", "Requested Maximum Bit Rate not Available", "Requested Maximum Bit Rate for DL not Available", "Requested Maximum Bit Rate for UL not Available", "Requested Guaranteed Bit Rate not Available", "Requested Guaranteed Bit Rate for DL not Available", "Requested Guaranteed Bit Rate for UL not Available", "Requested Transfer Delay not Achievable", "Invalid RAB Parameters Combination", "Condition Violation for SDU Parameters", "Condition Violation for Traffic Handling Priority", "Condition Violation for Guaranteed Bit Rate", "User Plane Versions not Supported", "Iu UP Failure", “Iu Transport Connection Failed to Establish”.

If the RAB ID of a RAB requested to be released is unknown in the RNC, this shall be reported as a RAB failed to release with the cause value "Invalid RAB ID".

The RNC may indicate an impending directed retry attempt to GSM by sending RAB ASSIGNMENT RESPONSE message with a RAB ID included in the list of RABs failed to setup and a cause value of “Directed Retry”.

The RNC shall be prepared to receive a RAB ASSIGNMENT REQUEST message containing a *RABs To Be Released* IE at any time and shall always reply to it. If there is an ongoing RAB Assignment procedure for a RAB indicated within the *RABs To Be Released* IE, the RNC shall discard the preceding RAB Assignment procedure for that specific RAB, release any related resources and report the released RAB within the RAB ASSIGNMENT RESPONSE message.

8.2.3 Unsuccessful Operation

The unsuccessful operation for this Class 3 Elementary procedure is described under the Successful Operation chapter.

8.2.4 Abnormal Conditions

Interactions with Relocation Preparation procedure:

If the relocation becomes necessary during the RAB Assignment procedure, the RNC may interrupt the ongoing RAB Assignment procedure and initiate the Relocation Preparation procedure as follows:

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification:

   - for all queued RABs;
   - for RABs not already established or modified, and
   - for RABs not already released;

   with the cause "Relocation triggered".

2. The RNC shall terminate the RAB Assignment procedure indicating successful RAB configuration modification:

   - for RABs already established or modified but not yet reported to the CN, and
   - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.
4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).
5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

Directed retry from UMTS to GSM (CS domain only):

In the case where the RNC has no RAB configuration for a particular UE in the CS domain, and the RNC receives a RAB ASSIGNMENT REQUEST message for that UE requesting the establishment of one RAB only, a directed retry to GSM may be initiated. In this case the RNC may interrupt the ongoing RAB Assignment procedure and initiate the Relocation Preparation procedure as follows:

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".
2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.
3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".
4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message

8.3 RAB Release Request

8.3.1 General

The purpose of the RAB Release Request procedure is to enable UTRAN to request the release of one or several radio access bearers. The procedure uses connection oriented signalling.

8.3.2 Successful Operation

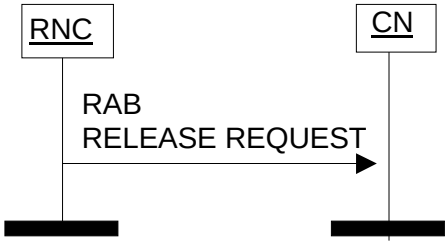

Figure 2: RAB Release Request procedure. Successful operation.

The RNC shall initiate the procedure by generating a RAB RELEASE REQUEST message towards the CN. The *RABs To Be Released* IE shall indicate the list of RABs requested to release and the *Cause* IE associated to each RAB shall indicate the reason for the release, e.g. "RAB pre-empted", "Release due to UTRAN Generated Reason".

Upon reception of the RAB RELEASE REQUEST message, the CN should initiate the appropriate release procedure for the identified RABs in the RAB RELEASE REQUEST message. It is up to the CN to decide how to react to the request.

Interaction with Iu Release Command:

If no RABs will remain according to the RAB RELEASE REQUEST message, the CN may decide to initiate the Iu Release procedure if it does not want to keep the Iu signalling connection. The cause value to use is “No Remaining RAB”.

Interaction with RAB Assignment (release RAB):

If the CN decides to release some or all indicated RABs, the CN may decide to invoke the RAB Assignment procedure (release RAB) to this effect.

8.3.3 Abnormal Conditions

Not applicable.

8.4 Iu Release Request

8.4.1 General

The purpose of the Iu Release Request procedure is to enable UTRAN to request the CN to release the Iu connection for a particular UE due to some UTRAN generated reason (e.g. "O&M Intervention", "Unspecified Failure", "User Inactivity", "Repeated Integrity Checking Failure" , "Release due to UE generated signalling connection release", "Radio Connection With UE Lost"). The procedure uses connection oriented signalling.

8.4.2 Successful Operation

Figure 3: Iu Release Request procedure. Successful operation.

The RNS controlling the Iu connection(s) of that particular UE shall initiate the procedure by generating an IU RELEASE REQUEST message towards the affected CN domain(s). The procedure may be initiated for instance when the contact with a particular UE is lost or due to user inactivity.

The IU RELEASE REQUEST message shall indicate the cause value for the requested Iu connection release. It is up to the CN to decide how to react to the request.

Interactions with Iu Release procedure:

If the CN decides to release the Iu connection, the CN shall initiate the Iu Release procedure.

8.4.3 Abnormal Conditions

Not applicable.

8.5 Iu Release

8.5.1 General

The purpose of the Iu Release procedure is to enable the CN to release the Iu connection and all UTRAN resources related only to that Iu connection to be released. The procedure uses connection oriented signalling.

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

- Completion of transaction between UE and CN.
- UTRAN generated reasons, e.g. reception of IU RELEASE REQUEST message.
- Completion of successful relocation of SRNS.
- Cancellation of relocation after successful completion of the Relocation Resource Allocation procedure.

8.5.2 Successful Operation

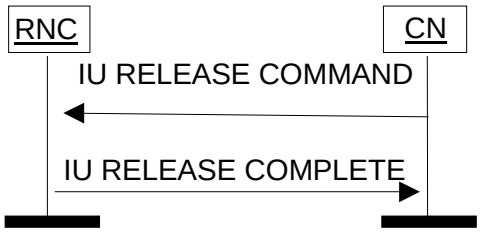

Figure 4: Iu Release procedure. Successful operation.

The procedure is initiated by the CN by sending an IU RELEASE COMMAND message to the UTRAN.

After the IU RELEASE COMMAND message has been sent, the CN shall not send further RANAP connection oriented messages on this particular connection.

The IU RELEASE COMMAND message shall include a *Cause* IE, indicating the reason for the release (e.g. "Successful Relocation", "Normal Release", "Release due to UTRAN Generated Reason", "Relocation Cancelled", "No Remaining RAB").

When the RNC receives the IU RELEASE COMMAND message:

1. Clearing of the related UTRAN resources is initiated. However, the UTRAN shall not clear resources related to other Iu signalling connections the UE might have. The Iu transport bearers for RABs subject to data forwarding and other UTRAN resources used for the GTP-PDU forwarding process, are released by the RNC only when the timer $T_{DATAfwd}$ expires.
2. The RNC returns any assigned Iu user plane resources to idle. Then the RNC sends an IU RELEASE COMPLETE message to the CN. (The RNC does not need to wait for the release of UTRAN radio resources to be completed before returning the IU RELEASE COMPLETE message.) When an IU RELEASE COMPLETE message is sent, the procedure is terminated in the UTRAN.

The IU RELEASE COMPLETE message shall include a *RABs Data Volume Report* IE for RABs towards the PS domain for which data volume reporting was requested during RAB establishment.

Reception of an IU RELEASE COMPLETE message terminates the procedure in the CN.

8.5.3 Abnormal Conditions

If the Iu Release procedure is not initiated towards the source RNC from the CN before the expiry of timer $T_{RELOCoverall}$, the source RNC should initiate the Iu Release Request procedure towards the CN with a cause value "$T_{RELOCoverall}$ expiry".

8.6 Relocation Preparation

8.6.1 General

The purpose of the Relocation Preparation procedure is to prepare relocation of SRNS either with involving UE or without involving UE. The relocation procedure shall be co-ordinated in all Iu signalling connections existing for the UE in order to allow Relocation co-ordination in the target RNC. The procedure uses connection oriented signalling.

The source RNC shall not initiate the Relocation Preparation procedure for an Iu signalling connection if a Prepared Relocation exists in the RNC for that Iu signalling connection or if a Relocation Preparation procedure is ongoing for that Iu signalling connection.

8.6.2 Successful Operation

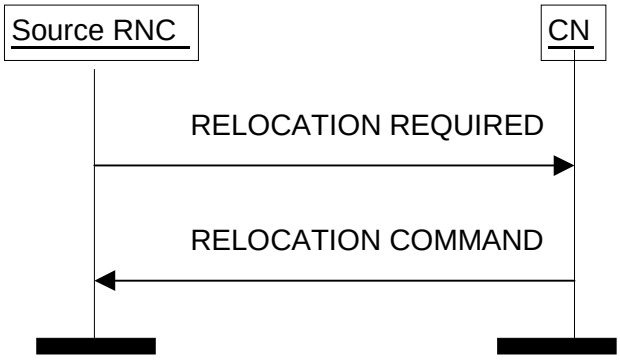

Figure 5: Relocation Preparation procedure. Successful operation.

The source RNC shall initiate the procedure by generating RELOCATION REQUIRED message. The source RNC shall decide whether to initiate the intra-system Relocation or the inter-system Relocation. In case of intra-system Relocation the source RNC shall indicate in the *Source ID* IE the RNC-ID of the source RNC and in the *Target ID* IE the RNC-ID of the target RNC. In case of inter-system Relocation the source RNC shall indicate in the *Source ID* IE the Service Area Identifier and in the *Target ID* IE the cell global identity of the cell in the target system. The source RNC shall indicate the appropriate cause value for the Relocation in the *Cause* IE. Typical cause values are "Time critical Relocation", "Resource optimisation relocation", "Relocation desirable for radio reasons" , "Directed Retry".

The source RNC shall determine whether the relocation of SRNS shall be executed with or without involvement of UE. The source RNC shall set the *Relocation Type* IE accordingly to "UE involved" or "UE not involved".

The source RNC shall indicate in the RELOCATION REQUIRED message the amount of Iu signalling connections existing for the UE by setting correctly the *Number of Iu Instances* IE included in the *Source RNC to Target RNC Transparent Container* IE. This container may also include the necessary information for Relocation co-ordination, security procedures and the handling of UE Capabilities. The container may include the RRC context to be relocated within the *RRC Container* IE. When the *Relocation Type* IE is set to "UE not involved in relocation of SRNS" and the UE is using DCH(s), DSCH(s) or USCH(s), the container shall include the mapping between each RAB subflow and transport channel identifier(s). When the RAB is carried on a DCH(s), the DCH ID(s) shall be included, and when it is carried on DSCH(s) or USCH(s), the DSCH ID(s) or USCH ID(s) respectively shall be included.

The source RNC shall send the RELOCATION REQUIRED message to the CN and the source RNC shall start the timer $T_{RELOCprep.}$

When the preparation including resource allocation in the target system is ready and the CN has decided to continue the relocation of SRNS, the CN shall send RELOCATION COMMAND message to the source RNC and the CN shall start the timer $T_{RELOCcompl}$.

For each RAB originating from the PS domain, the RELOCATION COMMAND message may contain Iu transport address and Iu transport association to be used for the forwarding of the DL N-PDU duplicates towards the relocation target. Upon reception of the RELOCATION COMMAND message from the PS domain, the source RNC shall start the timer $T_{DATAfwd.}$

The Relocation Preparation procedure is terminated in the CN by transmission of RELOCATION COMMAND message.

If *Relocation Type* IE was set to "UE involved" by the source RNC and if the target system does not support all existing RABs, the RELOCATION COMMAND message shall contain a list of RABs indicating all the RABs that are not supported by the target system. The source RNC shall pass this information to the radio protocols. The resources associated with these not supported RABs shall not be released until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

Upon reception of RELOCATION COMMAND message the source RNC shall stop the timer $T_{RELOCprep}$, RNC shall start the timer $T_{RELOCOverall}$ and RNC shall terminate the Relocation Preparation procedure. The source RNC is then defined to have a Prepared Relocation for that Iu signalling connection.

When Relocation Preparation procedure is terminated successfully and when the source RNC is ready, the source RNC should trigger the execution of relocation of SRNS.

In case of intersystem handover to GSM the RNC shall include *MS Classmark 2* and *MS Classmark 3* IEs received from the UE in the RELOCATION REQUIRED message to the CN.

Interactions with other procedures:

If, after RELOCATION REQUIRED message is sent and before the Relocation Preparation procedure is terminated, the source RNC receives a RANAP message initiating an other connection oriented RANAP class 1 or class 3 procedure (except IU RELEASE COMMAND message, which shall be handled normally) via the same Iu signalling connection, the source RNC shall either:

1. cancel the Relocation Preparation procedure i.e. execute Relocation Cancel procedure with an appropriate value for the *Cause* IE, e.g. "Interaction with other procedure", and after successful completion of Relocation Cancel procedure, the source RNC shall continue the initiated RANAP procedure;

or

2. terminate the initiated RANAP procedure without any changes in UTRAN by sending appropriate response message with the cause value “Relocation Triggered” to the CN. The source RNC shall then continue the relocation of SRNS.

If during the Relocation Preparation procedure the source RNC receives a DIRECT TRANSFER message it shall be handled normally.

If during the Relocation Preparation procedure the source RNC receives connection oriented RANAP class 2 messages (with the exception of DIRECT TRANSFER message) it shall decide to either execute the procedure immediately or suspend it. In the case the relocation is cancelled the RNC shall resume any suspended procedures (if any).

After Relocation Preparation procedure is terminated successfully, all RANAP messages (except IU RELEASE COMMAND message, which shall be handled normally) received via the same Iu signalling bearer shall be ignored by the source RNC.

8.6.3 Unsuccessful Operation

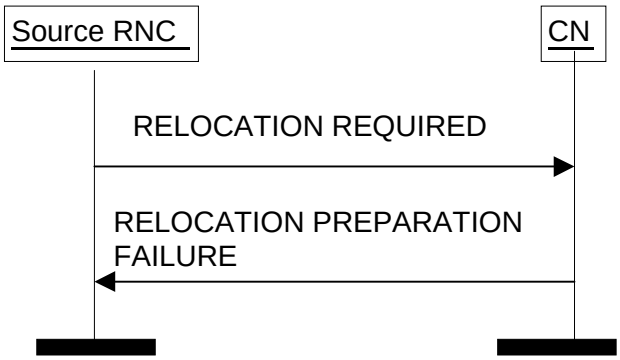

Figure 6: Relocation Preparation procedure. Unsuccessful operation.

If the CN or target system is not able to even partially accept the relocation of SRNS or a failure occurs during the Relocation Preparation procedure in the CN or the CN decides not to continue the relocation of SRNS, the CN shall send RELOCATION PREPARATION FAILURE message to the source RNC.

RELOCATION PREPARATION FAILURE message shall contain appropriate value for the *Cause* IE e.g. "$T_{RELOCalloc}$ expiry", "Relocation Failure in Target CN/RNC or Target System"., "Relocation not supported in Target RNC or Target System"

Transmission of RELOCATION PREPARATION FAILURE message terminates the procedure in the CN. Reception of RELOCATION PREPARATION FAILURE message terminates the procedure in UTRAN.

When the Relocation Preparation procedure is unsuccessfully terminated, the existing Iu signalling connection can be used normally.

If the Relocation Preparation procedure is terminated unsuccessfully, the CN shall release the possibly existing Iu signalling connection for the same UE and related to the same relocation of SRNS towards the target RNC by initiating Iu Release procedure towards the target RNC with an appropriate value for the *Cause* IE, e.g. "Relocation Cancelled".

Interactions with Relocation Cancel procedure:

If there is no response from the CN to the RELOCATION REQUIRED message before timer $T_{RELOCprep}$ expires in the source RNC, the source RNC shall cancel the Relocation Preparation procedure by initiating the Relocation Cancel procedure with appropriate value for the *Cause* IE, e.g. "$T_{RELOCprep}$ expiry".

8.6.4 Abnormal Conditions

If the target RNC, which was indicated in the RELOCATION REQUIRED message, is not known to the CN:

1. The CN shall reject the relocation of SRNS by sending a RELOCATION PREPARATION FAILURE message to the source RNC with *Cause* IE set to "Unknown target RNC".

2. The CN shall continue to use the existing Iu connection towards the source RNC.

8.6.5 Co-ordination of Two Iu Signalling Connections

If the RNC has decided to initiate Relocation Preparation procedure, the RNC shall initiate simultaneously Relocation Preparation procedure on all Iu signalling connections existing for the UE.

The source RNC shall not trigger the execution of relocation of SRNS unless it has received RELOCATION COMMAND message from all Iu signalling connections existing for the UE.

If the source RNC receives RELOCATION PREPARATION FAILURE message from the CN, the RNC shall initiate Relocation Cancel procedure on the other Iu signalling connection for the UE if the other Iu signalling connection exists and if the Relocation Preparation procedure is still ongoing or the procedure has terminated successfully in that Iu signalling connection.

8.7 Relocation Resource Allocation

8.7.1 General

The purpose of the Relocation Resource Allocation procedure is to allocate resources from target RNS for a relocation of SRNS. Procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

8.7.2 Successful Operation

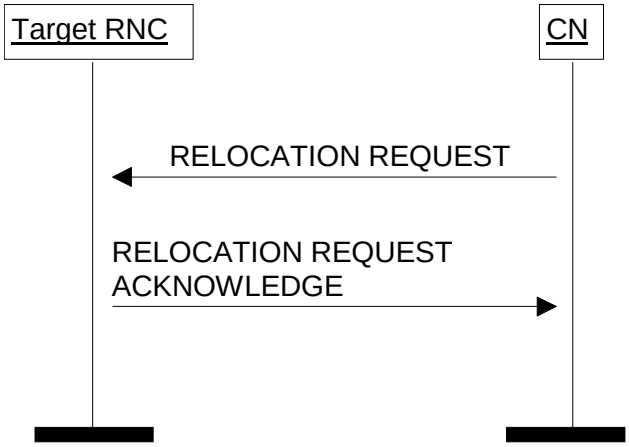

Figure 7: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation.

The CN shall transmit the RELOCATION REQUEST message to target RNC and the CN shall start the timer $T_{RELOCalloc.}$

Upon reception of the RELOCATION REQUEST message, the target RNC shall initiate allocation of requested resources. The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- RAB-ID
- User plane mode
- Priority level, queuing and pre-emption indication
- Service Handover

If the RELOCATION REQUEST message includes the *PDP Type Information* IE, the UTRAN may use this to configure any compression algorithms.

The *Cause* IE shall contain the same value as the one received in the related RELOCATION REQUIRED message.

The *Iu Signalling Connection Identifier* IE contains an Iu signalling connection identifier which is allocated by the CN, and which the RNC is required to store and remember for the duration of the Iu connection.

Following additional actions shall be executed in the target RNC during Relocation Resource Allocation procedure:

If the relocation type is "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.
- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

- The target RNC shall include information adapted to the resulting RAB configuration in the target to source RNC transparent container to be included in the RELOCATION REQUEST ACKNOWLEDGE message sent to the CN. If the target RNC supports triggering of the Relocation Detect procedure via the Iur interface, the RNC shall assign a d-RNTI for the context of the relocation and include it in the container. If two CNs are involved in the relocation of SRNS, the target RNC may, however, decide to send the container to only one CN.

If the relocation type IE is "UE not involved in relocation of SRNS":

- The target RNC may accept a RAB only if the radio bearer(s) for the RAB exist(s) and can be used for the RAB by the target RNC.

- If existing radio bearers are not related to any RAB that is accepted by target RNC, the radio bearers shall be ignored during the relocation of SRNS and the radio bearers shall be released by radio interface protocols after completion of relocation of SRNS.

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message received by the CN may optionally contain a transparent container, which shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the *NAS Synchronisation Indicator* IE is contained in the RELOCATION REQUEST message, the target RNC shall pass it to the source RNC within the *RRC Container* IE contained in the *Target RNC to Source RNC Transparent Container* IE.

Transmission and reception of RELOCATION REQUEST ACKNOWLEDGE message terminates the procedure in the UTRAN and the CN respectively.

8.7.3 Unsuccessful Operation

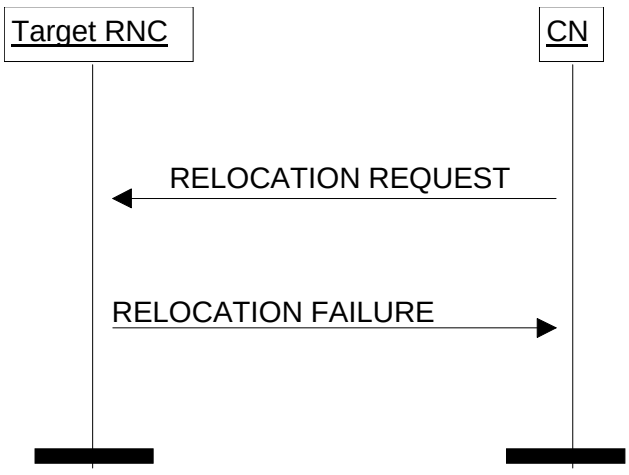

Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.

If the target RNC can not even partially accept the relocation of SRNS or a failure occurs during the Relocation Resource Allocation procedure in the target RNC, the target RNC shall send RELOCATION FAILURE message to the CN.

Transmission and reception of RELOCATION FAILURE message terminates the procedure in the UTRAN and the CN respectively.

When CN has received RELOCATION FAILURE message from target RNC, CN shall stop timer $T_{RELOCalloc}$ and shall assume possibly allocated resources within target RNC completely released.

8.7.4 Abnormal Conditions

If after reception of the RELOCATION REQUEST message, the target RNC receives another RELOCATION REQUEST message on the same Iu connection, then the target RNC shall discard the latter message and the original Relocation Resource Allocation procedure shall continue normally.

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ and the CN shall, if the Iu signalling connection has been established or later becomes established, initiate the Iu Release procedure towards the target RNC with an appropriate value for the *Cause* IE, e.g. "Relocation Cancelled".

8.7.5 Co-ordination of Two Iu Signalling Connections

Co-ordination of two Iu signalling connections during Relocation Resource Allocation procedure shall be executed by the target RNC when the *Number of Iu Instances* IE received in the *Source RNC to Target RNC Transparent Container* IE in the RELOCATION REQUEST message indicates that two CN domains are involved in relocation of SRNS.

If two CN domains are involved, the following actions shall be taken by the target RNC:

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.
- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.
- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.
- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

8.8 Relocation Detect

8.8.1 General

The purpose of Relocation Detect procedure is to indicate by the RNC the detection of SRNS relocation execution to the CN. Procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

8.8.2 Successful Operation

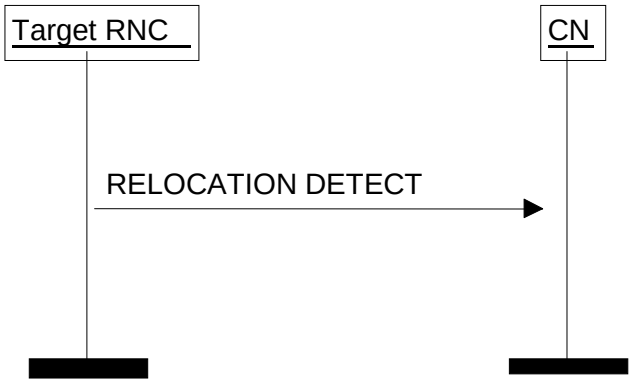

Figure 9: Relocation Detect procedure: Successful operation.

The target RNC shall send RELOCATION DETECT message to the CN when relocation execution trigger is received.

If the type of relocation of SRNS is "UE involved in relocation of SRNS", the relocation execution trigger may be received either from the Uu interface or as an implementation option from the Iur interface. If the type of relocation of SRNS is "UE not involved in relocation of SRNS", the relocation execution trigger is received from the Iur interface.

When RELOCATION DETECT message is sent, the target RNC shall start SRNC operation.

Upon reception of RELOCATION DETECT message, the CN may switch the user plane from the source RNC to the target RNC.

8.8.3 Abnormal Conditions

Interactions with Relocation Complete procedure:

If the RELOCATION COMPLETE message is received by CN before the reception of RELOCATION DETECT message, the CN shall handle the RELOCATION COMPLETE message normally.

8.8.4 Co-ordination of Two Iu Signalling Connections

When Relocation Detect procedure is to be initiated by the target RNC, the target RNC shall initiate the Relocation Detect procedure on all Iu signalling connections existing for the UE between the target RNC and the CN.

8.9 Relocation Complete

8.9.1 General

The purpose of Relocation Complete procedure is to indicate by the target RNC the completion of relocation of SRNS to the CN. Procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

8.9.2 Successful Operation

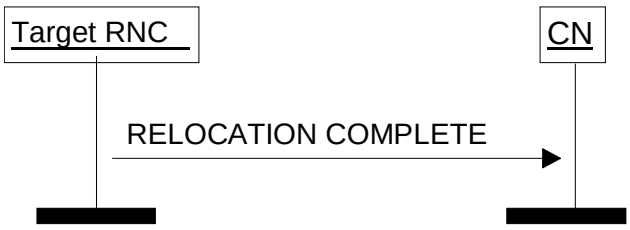

Figure 10: Relocation Complete procedure. Successful operation.

When the new SRNC-ID and serving RNC Radio Network Temporary Identity are successfully exchanged with the UE by the radio protocols, target RNC shall initiate Relocation Complete procedure by sending RELOCATION COMPLETE message to CN.

8.9.3 Abnormal Conditions

If the timer $T_{RELOCcomplete}$ expires:

- The CN should initiate release of Iu connections towards the source and the target RNC by initiating the Iu Release procedure with an appropriate value for the *Cause* IE, e.g. "$T_{RELOCcomplete}$ expiry".

Interactions with the Relocation Detect procedure:

If the RELOCATION DETECT message is not received by CN before reception of RELOCATION COMPLETE message, CN shall handle the RELOCATION COMPLETE message normally.

8.9.4 Co-ordination of Two Iu Signalling Connections

When Relocation Complete procedure is to be initiated by target RNC, target RNC shall initiate the Relocation Complete procedure on all Iu signalling connections existing for the UE between target RNC and CN.

8.10 Relocation Cancel

8.10.1 General

The purpose of the Relocation Cancel procedure is to enable source RNC to cancel an ongoing relocation of SRNS. The Relocation Cancel procedure may be initiated by the source RNC during and after the Relocation Preparation procedure if either of the following conditions is fulfilled:

1. Source RNC has not yet initiated the execution of relocation of SRNS, neither via the Iur interface nor via the Uu interface.

2. After having initiated the execution of relocation of SRNS the UE has returned to source RNC by transmitting an RRC message which indicates that the UE considers the source RNC as its serving RNC.

The procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

8.10.2 Successful Operation

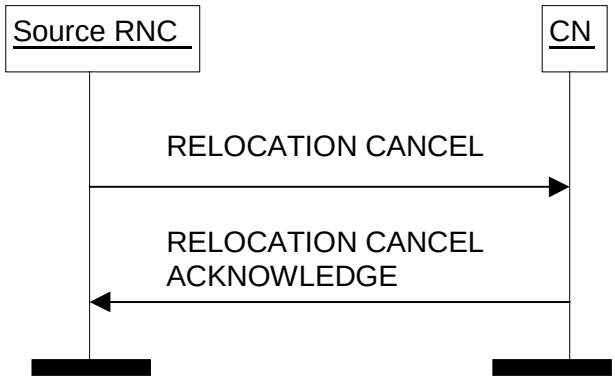

Figure 11: Relocation Cancel procedure. Successful operation.

RNC shall initiate the procedure by sending RELOCATION CANCEL message to CN. This message shall indicate the reason for cancelling the relocation of SRNS by appropriate value of the *Cause* IE. Upon reception of RELOCATION CANCEL message, CN shall send RELOCATION CANCEL ACKNOWLEDGE message to source RNC.

Transmission and reception of RELOCATION CANCEL ACKNOWLEDGE message terminates the procedure in CN and source RNC respectively. After this, the source RNC does not have a prepared relocation for that Iu signalling connection.

Interactions with Relocation Preparation procedure:

Upon reception of RELOCATION CANCEL message from source RNC, CN shall locally terminate the possibly ongoing Relocation Preparation procedure towards that RNC and abandon the relocation of SRNS.

If source RNC receives RELOCATION COMMAND message from CN after Relocation Cancel procedure is initiated, source RNC shall ignore the received RELOCATION COMMAND message.

8.10.3 Unsuccessful Operation

Not applicable.

8.10.4 Abnormal Conditions

Not applicable.

8.10.5 Co-ordination of Two Iu Signalling Connections

If Relocation Cancel procedure is to be initiated due to other reasons than reception of RELOCATION PREPARATION FAILURE message, Relocation Cancel procedure shall be initiated on all Iu signalling connections existing for the UE in which the Relocation Preparation procedure has not terminated unsuccessfully.

8.11 SRNS Context Transfer

8.11.1 General

The purpose of the SRNS Context Transfer procedure is to trigger the transfer of SRNS contexts from the source RNC to the CN (PS domain) in case of inter-system forward handover. The procedure uses connection oriented signalling.

8.11.2 Successful Operation

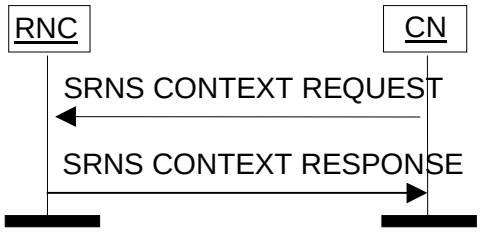

Figure 12: SRNS Context Transfer procedure. Successful operation.

The CN shall initiate the procedure by sending a SRNS CONTEXT REQUEST message to the source RNC. The SRNS CONTEXT REQUEST message shall include the list of RABs whose contexts should be transferred.

The source RNC shall respond to the CN with a SRNS CONTEXT RESPONSE message containing the RAB Context information for the referenced RABs. For each RAB, the following information elements shall be included:

- RAB ID;
- always when available, the sequence number for the next downlink GTP-PDU to be sent to the UE i.e. DL GTP-PDU Sequence Number;
- always when available, the sequence number for the next uplink GTP-PDU to be tunnelled to the GGSN i.e. UL GTP-PDU Sequence Number;
- always when available, the radio interface sequence number (PDCP) [17] of the next downlink N-PDU (PDCP SDU) that would have been sent to the UE by a source system i.e. *DL N-PDU Sequence Number* IE;
- always when available, the radio interface sequence number (PDCP) [17] of the next uplink N-PDU (PDCP SDU) that would have been expected from the UE by a source system i.e. *UL N-PDU Sequence Number* IE.

Transmission and reception of the SRNS CONTEXT RESPONSE message shall terminate the procedure in the UTRAN and the CN respectively.

8.11.3 Unsuccessful Operation

The RAB ID for each RAB for which UTRAN is not able to transfer the RAB context, e.g. if no sequence numbers are available, is included in the SRNS CONTEXT RESPONSE message together with a *Cause* IE, e.g. "Invalid RAB ID", "Requested Information Not Available".

8.11.4 Abnormal Conditions

Not applicable.

8.12 SRNS Data Forwarding Initiation

8.12.1 General

The purpose of the SRNS Data Forwarding procedure is to trigger the transfer of N-PDUs from the RNC to the CN (PS domain) in case of inter-system forward handover. The procedure uses connection oriented signalling.

8.12.2 Successful Operation

Figure 13: SRNS Data Forwarding Initiation procedure. Successful operation.

CN initiates the procedure by sending SRNS DATA FORWARD COMMAND message to UTRAN. SRNS DATA FORWARD COMMAND message includes the list of RABs whose data should be forwarded and the necessary information for establishing a GTP tunnel to be used for data forwarding.

Upon reception of SRNS DATA FORWARD COMMAND message RNC starts the timer $T_{DATAfwd}$.

8.12.3 Abnormal Conditions

Not applicable.

8.13 SRNS Context Forwarding from Source RNC to CN

8.13.1 General

The purpose of this procedure is to transfer SRNS contexts from the source RNC to the CN (PS domain) in case of handover via the CN. The procedure uses connection oriented signalling. SRNS contexts are sent for each concerned RAB, for which at least either GTP-PDU or PDCP sequence numbering is available. The contexts contain the sequence numbers of the GTP-PDUs next to be transmitted in the uplink and downlink directions, if available, and the next PDCP sequence numbers that would have been used to send and receive data from the UE, if available.

8.13.2 Successful Operation

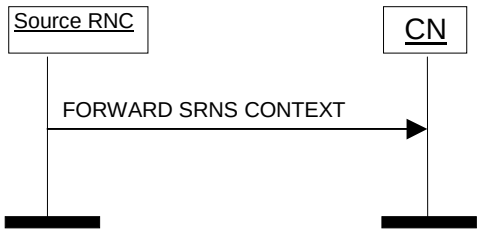

Figure 14: SRNS Context forwarding from source RNC to CN. Successful operation.

The source RNC initialises the procedure by sending FORWARD SRNS CONTEXT message to the CN. The FORWARD SRNS CONTEXT message contains the RAB Context information for each referenced RAB. For each RAB the following information shall be included:

- RAB ID
- always when available, the sequence number for the next downlink GTP-PDU to be sent to the UE, and
- always when available, the sequence number for the next uplink GTP-PDU to be tunnelled to the GGSN;
- always when available, the radio interface sequence number (PDCP) [17] of the next uplink N-PDU (PDCP SDU) that would have been expected from the UE by a source system i.e. *UL N-PDU Sequence Number* IE;
- always when available, the radio interface sequence number (PDCP) [17] of the next downlink N-PDU (PDCP SDU) that would have been sent to the UE by a source system i.e. *DL N-PDU Sequence Number* IE.

8.13.3 Abnormal Conditions

Not applicable.

8.14 SRNS Context Forwarding to Target RNC from CN

8.14.1 General

The purpose of this procedure is to transfer SRNS contexts from the CN (PS domain) to the target RNC in case of handover via the CN. The procedure uses connection oriented signalling. SRNS contexts are sent for each referenced RAB, for which at least either GTP-PDU or PDCP sequence numbering is available. The contexts contain the sequence numbers of the GTP-PDUs next to be transmitted in the uplink and downlink directions, if available, and the next PDCP sequence numbers that would have been used to send and receive data from the UE, if available,.

8.14.2 Successful Operation

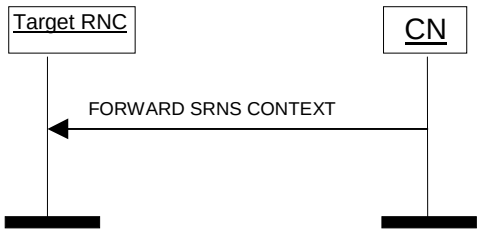

Figure 15: SRNS Context forwarding to target RNC from CN. Successful operation.

The CN initialises the procedure by sending FORWARD SRNS CONTEXT message to the target RNC. The FORWARD SRNS CONTEXT message contains the RAB Context information for each referenced RAB. For each RAB the following information shall be included:

- RAB ID
- always when available, the sequence number for the next downlink GTP-PDU to be sent to the UE, and
- always when available, the sequence number for the next uplink GTP-PDU to be tunnelled to the GGSN;
- always when available, the radio interface sequence number (PDCP) [17] of the next uplink N-PDU (PDCP SDU) that would have been expected from the UE by a source system i.e. *UL N-PDU Sequence Number* IE;
- always when available, the radio interface sequence number (PDCP) [17] of the next downlink N-PDU (PDCP SDU) that would have been sent to the UE by a source system i.e. *DL N-PDU Sequence Number* IE.

8.14.3 Abnormal Conditions

Not applicable.

8.15 Paging

8.15.1 General

The purpose of the Paging procedure is to enable the CN to page a UE for a UE terminating service request. The procedure uses connectionless signalling.

8.15.2 Successful Operation

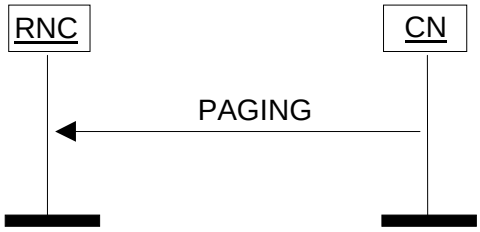

Figure 16: Paging procedure. Successful operation.

The CN shall initiate the procedure by sending a PAGING message. This message shall contain information necessary for RNC to be able to page the UE, like:

- CN Domain Indicator.
- Permanent NAS UE Identity.
- Temporary UE Identity.
- Paging Area.
- Paging Cause.
- Non Searching Indicator.
- DRX Cycle Length Coefficient

The *CN Domain Indicator* IE shall be used by the RNC to identify from which CN domain the PAGING message originates.

The *Permanent NAS UE Identity* IE (i.e. IMSI) shall be used by the UTRAN paging co-ordination function to check if a signalling connection towards the other CN domain already exists for this UE. In that case, the radio interface paging message can be sent via that connection instead of using the paging broadcast channel.

The *Temporary UE Identity* IE (e.g. TMSI) is the identity of the user that shall be used over the paging channel. If the *Temporary UE Identity* IE is not included in the PAGING message, the RNC shall use the Permanent UE Identity instead.

The *Paging Area* IE shall be used by the RNC to identify the area in which the radio interface paging message shall be broadcast in case no signalling connection, as described above, already exists for the UE. If the *Paging Area* IE is not included in the PAGING message, the whole RNC area shall be used as Paging Area.

The *Paging Cause* IE shall indicate to the RNC the reason for sending the PAGING message. The paging cause is transferred transparently to the UE.

The *Non Searching Indication* IE shall be used by the RNC to decide whether the UTRAN paging co-ordination function needs to be activated or not. In the absence of this IE, UTRAN paging co-ordination shall be performed.

If the *DRX Cycle Length Coefficient* IE is included in the PAGING message, UTRAN shall, when applicable, use it for calculating the paging occasions for the UE.

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

The core network is responsible for the paging repetition over the Iu interface.

8.15.3 Abnormal Conditions

Not applicable.

8.16 Common ID

8.16.1 General

The purpose of the Common ID procedure is to inform the RNC about the permanent NAS UE Identity (i.e. IMSI) of a user. This is used by the RNC e.g. to create a reference between the permanent NAS UE identity of the user and the RRC connection of that user for UTRAN paging co-ordination. The procedure uses connection oriented signalling.

8.16.2 Successful Operation

Figure 17: Common ID procedure. Successful operation.

After having established an Iu signalling connection, and if the Permanent NAS UE identity (i.e. IMSI) is available, the CN shall send a COMMON ID message, containing the *Permanent NAS UE Identity* IE to the RNC. The RNC shall associate the permanent identity to the RRC Connection of that user and shall save it for the duration of the RRC connection.

8.16.3 Abnormal Conditions

Not applicable.

8.17 CN Invoke Trace

8.17.1 General

The purpose of the CN Invoke Trace procedure is to inform the RNC that it should begin producing a trace record of a type indicated by the CN and related to the UE. The procedure uses connection oriented signalling.

8.17.2 Successful Operation

Figure 18: CN Invoke Trace procedure. Successful operation.

The CN Invoke Trace procedure is invoked by the CN by sending a CN INVOKE TRACE message to the RNC.

The events and parameters to be recorded are indicated in the *Trace Type* IE.

The *OMC ID* IE, if present, indicates the OMC to which the record is destined.

The message includes a *Trace Reference* IE which is allocated by the entity which triggered the trace.

The *Trigger ID* IE, if present, indicates the entity which triggered the trace.

The *Trace Reference* and *Trigger ID* IEs are used to tag the trace record to allow simpler construction of the total record by the entity which combines trace records.

Interaction with Relocation:

The order to perform tracing is lost in UTRAN at successful Relocation of SRNS. If the tracing shall continue also after the relocation has been performed, the CN Invoke Trace procedure shall thus be re-initiated from the CN towards the future SRNC after the Relocation Resource Allocation procedure has been executed successfully.

8.17.3 Abnormal Conditions

Not applicable.

8.18 Security Mode Control

8.18.1 General

The purpose of the Security Mode Control procedure is to allow the CN to pass cipher and integrity mode information to the UTRAN. UTRAN uses this information to select and load the encryption device for user and signalling data with the appropriate parameters, and also to store the appropriate parameters for the integrity algorithm. The procedure uses connection oriented signalling.

8.18.2 Successful Operation

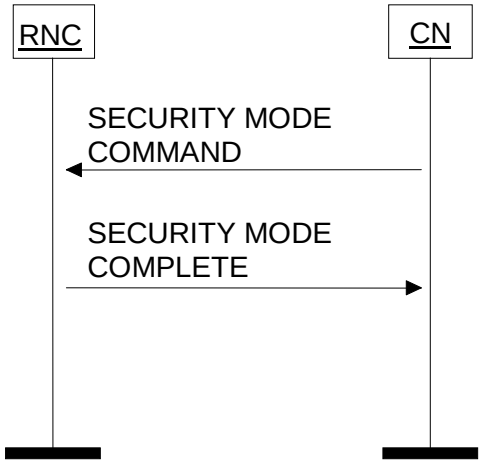

Figure 19: Security Mode Control procedure. Successful operation.

The CN shall start the procedure by sending to the UTRAN a SECURITY MODE COMMAND message. This message shall specify which ciphering, if any, and integrity protection algorithms may be used by the UTRAN.

The *Permitted Encryption Algorithms* IE may contain “no encryption” within its list in order to allow the RNC not to cipher the respective connection if it cannot support any of the indicated UEAs. In the absence of the *Encryption Information* group IE in SECURITY MODE COMMAND message, the RNC shall handle it as no encryption.

Upon reception of the SECURITY MODE COMMAND message, the UTRAN shall internally select appropriate algorithms, taking into account the UE/UTRAN capabilities. The UTRAN shall then trigger the execution of the

corresponding radio interface procedure and, if applicable, invoke the encryption device and also start the integrity protection.

When the execution of the radio interface procedure is successfully finished, UTRAN shall return a SECURITY MODE COMPLETE message to the CN. This message shall include the chosen integrity protection and encryption algorithms.

The *Chosen Encryption* IE shall be included in the SECURITY MODE COMPLETE message if, and only if the *Encryption Information* IE was included in the SECURITY MODE COMMAND message.

The set of permitted algorithms specified in the SECURITY MODE COMMAND message shall remain applicable for subsequent RAB Assignments and Intra-UTRAN Relocations.

In case of a UE with Radio Access Bearers towards both core networks, the user data towards CS shall always be ciphered according to the information received from CS and the user data towards PS with the information received from PS. The signalling data shall always be ciphered with the last received ciphering information and integrity protected with the last received integrity protection information from any of the two CNs.

8.18.3 Unsuccessful Operation

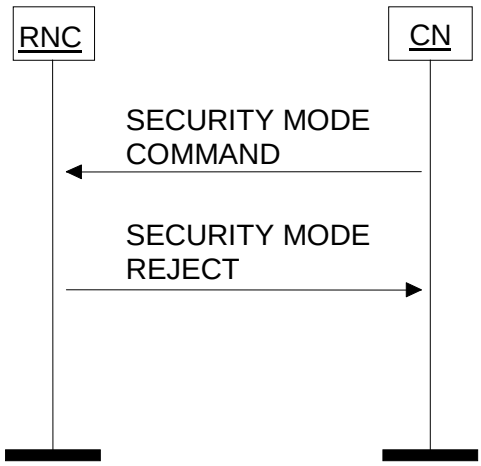

Figure 20: Security Mode Control procedure. Unsuccessful operation.

If the UTRAN or the UE is unable to support the ciphering and/or integrity protection algorithms specified in the SECURITY MODE COMMAND message, then the UTRAN shall return to CN a SECURITY MODE REJECT message with cause value "Requested Ciphering and/or Integrity Protection Algorithms not Supported". If the radio interface Security Control procedure fails, a SECURITY MODE REJECT message shall be sent to CN with cause value "Failure in the Radio Interface Procedure".

8.18.4 Abnormal Conditions

A SECURITY MODE REJECT message shall be returned if a CN requests a change of ciphering and/or integrity protection algorithms for a UE when ciphering or integrity protection is already active for that CN and such a change of algorithms is not supported by UTRAN and/or the UE. A cause value shall be set to "Change of Ciphering and/or Integrity Protection is not Supported".

8.19 Location Reporting Control

8.19.1 General

The purpose of the Location Reporting Control procedure is to allow the CN to request information on the location of a given UE. The procedure uses connection oriented signalling.

8.19.2 Successful Operation

Figure 21: Location Reporting Control procedure. Successful operation.

The CN shall initiate the procedure by generating a LOCATION REPORTING CONTROL message.

The *Request Type* IE shall indicate to the serving RNC whether:

- to report directly;
- to report upon change of Service area, or
- to stop reporting.

If reporting upon change of Service Area is requested, the Serving RNC shall report whenever the UE moves between Service Areas. For this procedure, only Service Areas that are defined for the PS and CS domains shall be considered.

The *Request Type* IE shall also indicate what type of location information the serving RNC shall report. The location information is either of the following types:

- Service Area Identifier, or
- Geographical coordinates, with or without requested accuracy.

A request for a direct report can be done in parallel with having an active request to report upon change of Service Area for the same UE. The request to report upon change of Service Area shall not be affected by this.

Interaction with Relocation:

The order to perform location reporting at change of Service Area is lost in UTRAN at successful Relocation of SRNS. If the location reporting at change of Service Area shall continue also after the relocation has been performed, the Location Reporting Control procedure shall thus be re-initiated from the CN towards the future SRNC after the Relocation Resource Allocation procedure has been executed successfully.

8.19.3 Abnormal Conditions

Not applicable.

8.20 Location Report

8.20.1 General

The purpose of the Location Report procedure is to provide the UE's location information to the CN. The procedure uses connection oriented signalling.

8.20.2 Successful Operation

Figure 22: Location Report procedure. Successful operation.

The serving RNC shall initiate the procedure by generating a LOCATION REPORT message. The LOCATION REPORT message may be used as a response for the LOCATION REPORTING CONTROL message. Also, when a user enters or leaves a classified zone set by O&M, e.g. zone where a disaster occurred, a LOCATION REPORT message shall be sent to the CN including the Service Area of the UE in the *Area Identity* IE. The *Cause* IE shall indicate the appropriate cause value to CN, e.g. "User Restriction Start Indication" and "User Restriction End Indication". The CN shall react to the LOCATION REPORT message with CN vendor specific actions.

For this procedure, only Service Areas that are defined for the PS and CS domains shall be considered.

In case reporting at change of Service Area is requested by the CN, then the RNC shall issue a LOCATION REPORT message

- whenever the information given in the previous LOCATION REPORT message or INITIAL UE MESSAGE message is not anymore valid.

- upon receipt of the first LOCATION REPORTING CONTROL message following a performed relocation, with *Request Type* IE set to "Change of Service Area", as soon as SAI becomes available in the new SRNC.

In the case when Service Area is reported, the RNC shall include to the LOCATION REPORT message in the *Area Identity* IE the Service Area, which includes at least one of the cells from which the UE is consuming radio resources.

If the RNC can not deliver the location information as requested by the CN, the RNC shall indicate the UE location to be "Undetermined" by omitting the *Area Identity* IE. A cause value shall instead be added to indicate the reason for the undetermined location, e.g. "Requested Report Type not supported". In case the "Requested Report Type not supported" cause value is used, then also the *Request Type* IE shall be included as a reference of what report type is not supported.

If the Location Report procedure was triggered by a LOCATION REPORTING CONTROL message, which included a request for a geographical area with a specific accuracy, the LOCATION REPORT message shall include either a point with indicated uncertainty or a polygon, which both shall fulfill the requested accuracy as accurately as possible. If, on the other hand, no specific accuracy level was requested in the LOCATION REPORTING CONTROL message, it is up to UTRAN to decide with which accuracy to report.

8.20.3 Abnormal Conditions

Not applicable.

8.21 Data Volume Report

8.21.1 General

The Data Volume Report procedure is used by CN to request the unsuccessfully transmitted DL data volume for specific RABs. This procedure only applies to PS domain. The procedure uses connection oriented signalling.

8.21.2 Successful Operation

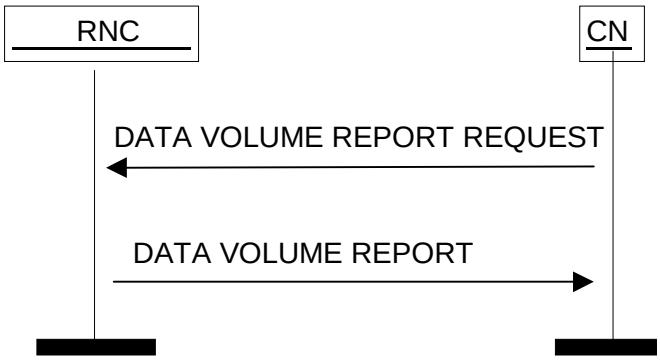

Figure 23: Data Volume Report procedure. Successful operation.

The procedure is initiated by CN by sending DATA VOLUME REPORT REQUEST message to UTRAN. This message shall contain the list of *RAB ID* IEs to identify the RABs for which the unsuccessfully transmitted DL data volume shall be reported.

At reception of DATA VOLUME REPORT REQUEST message UTRAN shall produce the DATA VOLUME REPORT message indicating the amount of unsuccessfully transmitted DL data for the addressed RABs since the last data volume indication to CN. UTRAN shall also reset the data volume counter for the reported RABs. UTRAN shall send the DATA VOLUME REPORT message to CN. Transmission and reception of DATA VOLUME REPORT message terminates the procedure in UTRAN and CN respectively.

The *Data Volume Reference* IE, if included, indicates the time when the data volume is counted.

8.21.3 Unsuccessful Operation

The RAB ID for each RAB for which UTRAN is not able to transfer a data volume report is included in the DATA VOLUME REPORT message together with a *Cause* IE, e.g. "Invalid RAB ID".

8.21.4 Abnormal Conditions

Not applicable.

8.22 Initial UE Message

8.22.1 General

The purpose of the Initial UE Message procedure is to establish an Iu signalling connection between a CN domain and the RNC and to transfer the initial NAS-PDU to the CN. The procedure uses connection oriented signalling.

8.22.2 Successful Operation

Figure 24: Initial UE Message procedure. Successful operation.

When RNC has received from radio interface a NAS message (see ref. [8]) to be forwarded to CN domain to which the Iu signalling connection for the UE does not exist, RNC shall initiate the Initial UE Message procedure and send the INITIAL UE MESSAGE message to the CN.

In addition to the received NAS-PDU, RNC shall add following information to the INITIAL UE MESSAGE message:

- CN domain indicator, indicating the CN domain towards which this message is sent.
- For CS domain, the LAI which was the last LAI indicated to the UE by UTRAN via the current RRC connection, or if UTRAN had not yet indicated any LAI to the UE via the current RRC connection, then the LAI of the cell via which the current RRC connection was established.
- For PS domain, the LAI+RAC which were the last LAI+RAC indicated to the UE by UTRAN via the current RRC connection, or if UTRAN had not yet indicated any LAI+RAC to the UE via the current RRC connection, then the LAI+RAC of the cell via which the current RRC connection was established.
- Service Area corresponding to at least one of the cells from which the UE is consuming radio resources.
- Iu signalling connection identifier.

The *Iu Signalling Connection Identifier* IE contains an Iu signalling connection identifier which is allocated by the RNC, and which the CN is required to store and remember for the duration of the Iu connection.

Whereas several processing entities within the CN (e.g. charging, interception, etc.) may make use of the location information given in the *SAI* IE and the *LAI* (and *RAC*) IE, the mobility management within the CN shall rely on the information given within the *LAI* IE (resp. *LAI* and *RAC* IEs) only.

8.23 Direct Transfer

8.23.1 General

The purpose of the Direct Transfer procedure is 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 (see ref. [8]). The UE – CN signalling messages are transported as a parameter in the DIRECT TRANSFER messages. The procedure uses connection oriented signalling.

8.23.2 Successful Operation

8.23.2.1 CN Originated Direct Transfer

Figure 25: Direct Transfer, CN originated. Successful operation.

If a UE – CN signalling message has to be sent from the CN to the UE, the CN shall send a DIRECT TRANSFER message to the RNC including the UE – CN signalling message as a *NAS-PDU* IE.

The use of the SAPI included in the DIRECT TRANSFER message enables the UTRAN to provide specific service for the transport of the messages.

8.23.2.2 UTRAN Originated Direct Transfer

Figure 26: Direct Transfer, RNC originated. Successful operation.

If a UE – CN signalling message has to be sent from the RNC to the CN without interpretation, the RNC shall send a DIRECT TRANSFER message to the CN including the UE – CN signalling message as a *NAS-PDU* IE.

If the DIRECT TRANSFER message shall be sent to the PS domain, RNC shall also add the *LAI* and the *RAC* IEs, which were the last LAI+RAC indicated to the UE by UTRAN via the current RRC connection, or if UTRAN had not yet indicated any LAI+RAC to the UE via the current RRC connection, then the LAI+RAC of the cell via which the current RRC connection was established. The RNC shall also add Service Area corresponding to at least one of the cells from which the UE is consuming radio resources.

8.24 CN Information Broadcast

Void

8.24.1 General

Void

8.24.2 Successful Operation

Void

8.24.3 Unsuccessful Operation

Void

8.24.4 Abnormal Conditions

Void

8.25 Overload Control

8.25.1 General

This procedure is defined to give some degree of signalling 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. The procedure uses connectionless signalling.

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

At the CN side:

- If T_{igOC} is not running and an OVERLOAD message or "Signalling Point Congested" information is received, the traffic should be reduced by one step. It is also possible, optionally, to indicate the number of steps to reduce the traffic. At the same time, timers T_{igOC} and T_{inTC} should be started.
- During T_{igOC} all received OVERLOAD messages or "Signalling Point Congested" information should be ignored.

- This step by step reduction of traffic should be continued until maximum reduction is obtained by arriving at the last step.

- If T_{inTC} expires (i.e. no OVERLOAD message or "Signalling Point Congested" information is received during T_{inTC}) the traffic should be increased by one step and T_{inTC} should be started unless normal load has been resumed.

At the UTRAN side:

- If T_{igOR} is not running and an OVERLOAD message or "Signalling Point Congested" information is received, the traffic should be reduced by one step. It is also possible, optionally, to indicate the number of steps to reduce the traffic. At the same time, timers T_{igOR} and T_{inTR} should be started.

- During T_{igOR} all received OVERLOAD messages or "Signalling Point Congested" information should be ignored.

- This step-by-step reduction of traffic should be continued until maximum reduction is obtained by arriving at the last step.

- If T_{inTR} expires (i.e. no OVERLOAD message or "Signalling Point Congested" information is received during T_{inTR}) the traffic should be increased by one step and T_{inTR} should be started unless normal load has been resumed.

The number of steps and the method of reducing the load are considered to be an implementation specific function.

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

8.25.2 Philosophy

Void

8.25.3 Successful Operation

8.25.3.1 Overload at the CN

Figure 27: Overload at the CN. Successful operation.

The CN should indicate to the RNC that it is in a congested state by sending an OVERLOAD message.

At the UTRAN receipt of this message should cause the reduction of traffic to the CN node sending the message.

8.25.3.2 Overload at the UTRAN

Figure 28: Overload at the UTRAN. Successful operation.

If the UTRAN is not capable to send signalling messages to the UE due to overloaded resources then the UTRAN should send an OVERLOAD message to the CN.

8.25.4 Abnormal Conditions

Not applicable.

8.26 Reset

8.26.1 General

The purpose of the Reset procedure is to initialise the UTRAN in the event of a failure in the CN or vice versa. The procedure uses connectionless signalling.

8.26.2 Successful Operation

8.26.2.1 Reset Procedure Initiated from the CN

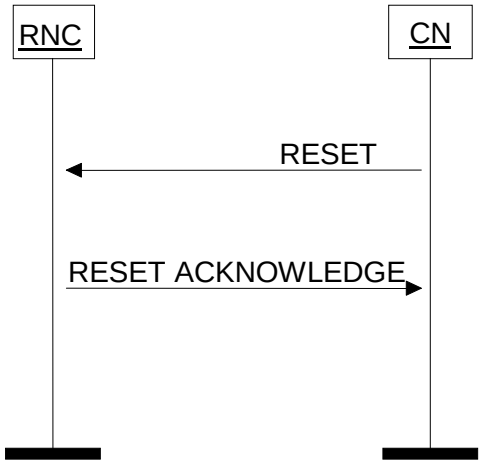

Figure 29: Reset procedure initiated from the CN. Successful operation.

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

After a guard period of T_{RatC} seconds a RESET ACKNOWLEDGE message shall be 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.

Interactions with other procedures:

In case of interactions with other procedures, the Reset procedure shall always override all other procedures.

8.26.2.2 Reset Procedure Initiated from the UTRAN

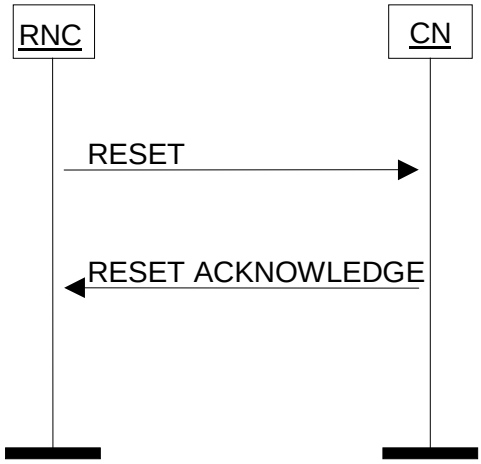

Figure 30: Reset procedure initiated from the UTRAN. Successful operation.

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

After a guard period of T_{RatR} seconds a RESET ACKNOWLEDGE message shall be returned to the UTRAN indicating that all references have been cleared.

Interactions with other procedures:

In case of interactions with other procedures, the Reset procedure shall always override all other procedures.

8.26.3 Abnormal Conditions

8.26.3.1 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_{RafR} then it shall repeat the entire Reset procedure. The sending of the RESET message shall be repeated a maximum of "n" times where n is an operator matter. After the n-th unsuccessful repetition the procedure shall be stopped and e.g. the maintenance system be informed.

8.26.3.2 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_{RafC} then it shall repeat the entire Reset procedure. The sending of the RESET message shall be repeated a maximum of "n" times where n is an operator matter. After the n-th unsuccessful repetition the procedure shall be stopped and e.g. the maintenance system be informed.

8.26.3.3 Crossing of Reset Messages

When an entity that has sent a RESET message and is waiting for a RESET ACKNOWLEDGE message, instead receives a RESET message from the peer entity, it shall stop timer T_{RafC} or T_{RafR} and send a RESET ACKNOWLEDGE message to the peer entity.

8.27 Error Indication

8.27.1 General

The Error Indication procedure is initiated by a node to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

If the error situation arises due to reception of a message utilising dedicated signalling, then the Error Indication procedure uses connection oriented signalling. Otherwise the procedure uses connectionless signalling.

8.27.2 Successful Operation

Figure 31: Error Indication procedure, CN originated. Successful operation.

Figure 32: Error Indication procedure, RNC originated. Successful operation.

When the conditions defined in chapter 10 are fulfilled, the Error Indication procedure is initiated by an ERROR INDICATION message sent from the receiving node.

Examples for possible cause values for protocol error indications are:

- "Transfer Syntax Error".
- "Semantic Error".
- "Message not compatible with receiver state".

8.27.3 Abnormal Conditions

Not applicable.

8.28 CN Deactivate Trace

8.28.1 General

The purpose of the CN Deactivate Trace procedure is to inform the RNC that it should stop producing a trace record for the indicated trace reference. The procedure uses the connection oriented signalling.

8.28.2 Successful Operation

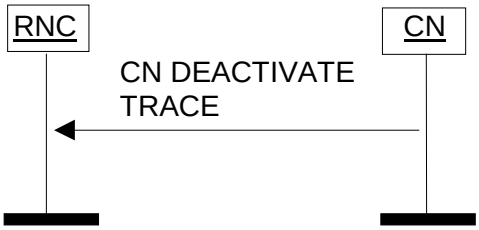

Figure 33: CN Deactivate Trace procedure. Successful operation.

The CN Deactivate Trace procedure is invoked by the CN sending a CN DEACTIVATE TRACE message to the UTRAN.

The *Trace Reference* IE and, if present, the *Trigger ID* IE are used to indicate which trace shall be stopped.

8.28.3 Abnormal Conditions

If the RNC receives a CN DEACTIVATE TRACE message with an unknown trace reference, the RNC shall take no action.

8.29 Reset Resource

8.29.1 General

The purpose of the Reset Resource procedure is to initialise part of the UTRAN in the event of an abnormal failure in the CN or vice versa (e.g. Signalling Transport processor reset). The procedure uses connectionless signalling.

8.29.1.1 Reset Resource procedure initiated from the RNC

Void

8.29.1.2 Reset Resource procedure initiated from the CN

void

8.29.2 Successful Operation

8.29.2.1 Reset Resource procedure initiated from the RNC

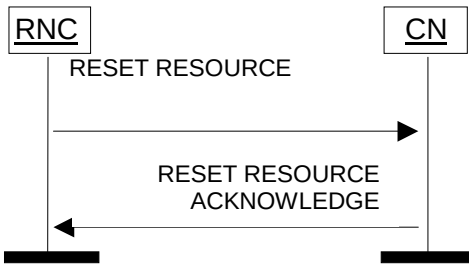

Figure 34: RNC initiated Reset Resource procedure. Successful operation.

The RNC initiates this procedure by sending a RESET RESOURCE message to the CN.

The RESET RESOURCE message shall include a *Cause* IE with appropriate cause value (e.g. "Signalling Transport Resource Failure").

On reception of this message the CN shall release locally the resources and references (i.e. resources and Iu signalling connection identifiers) associated to the Iu signalling connection identifiers indicated in the received message. The CN shall always return the RESET RESOURCE ACKNOWLEDGE message to the RNC when all Iu-related resources and references have been released. The list of Iu signalling connection identifiers within the RESET RESOURCE ACKNOWLEDGE message shall be in the same order as received in the RESET RESOURCE message. Unknown signalling connection identifiers shall be reported as released.

Both CN and RNC shall provide means to prevent the immediate re-assignment of released Iu signalling connection identifiers to minimise the risk that the Reset Resource procedure releases the same Iu signalling connection identifiers re-assigned to new Iu connections.

8.29.2.2 Reset Resource procedure initiated from the CN

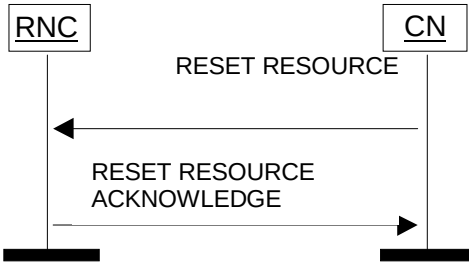

Figure 35: CN initiated Reset Resource procedure. Successful operation.

The CN initiates this procedure by sending a RESET RESOURCE message to the RNC.

The RESET RESOURCE message shall include a *Cause* IE with appropriate cause value (e.g. "Signalling Transport Resource Failure").

On reception of this message the RNC shall release locally the resources and references (i.e. radio resources and Iu signalling connectionidentifiers) associated to the Iu signalling connection identifiers indicated in the received message. The RNC shall always return the RESET RESOURCE ACKNOWLEDGE message to the CN when all Iu-related resources and references have been released. The list of Iu signalling connection identifiers within the RESET RESOURCE ACKNOWLEDGE message shall be in the same order as received in the RESET RESOURCE message. Unknown signalling connection identifiers shall be reported as released.

Both RNC and CN shall provide means to prevent the immediate re-assignment of released Iu signalling connection identifiers to minimise the risk that the Reset Resource procedure releases the same Iu signalling connection identifiers re-assigned to new Iu connections.

9 Elements for RANAP Communication

9.1 Message Functional Definition and Content

9.1.1 General

Section 9.1 presents the contents of RANAP messages in tabular format. The corresponding ASN.1 definition is presented in section 9.3. In case there is contradiction between the tabular format in section 9.1 and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional IEs, where the tabular format shall take precedence.

NOTE: The messages have been defined in accordance to the guidelines specified in [18].

9.1.2 Message Contents

9.1.2.1 Presence

All information elements in the message descriptions below are marked mandatory, optional or conditional according to the following table:

Table 4: Meaning of abbreviations used in RANAP messages

Abbreviation	Meaning
M	IEs marked as Mandatory (M) will always be included in the message.
O	IEs marked as Optional (O) may or may not be included in the message.
C	IEs marked as Conditional (C) will be included in a message only if the condition is satisfied. Otherwise the IE is not included.

9.1.2.2 Criticality

Each Information Element or Group of Information Elements may have criticality information applied to it. Following cases are possible:

Table 5: Meaning of content within "Criticality" column

Abbreviation	Meaning
–	No criticality information is applied explicitly.
YES	Criticality information is applied. This is usable only for non-repeatable IEs
GLOBAL	The IE and all its repetitions together have one common criticality information. This is usable only for repeatable IEs.
EACH	Each repetition of the IE has its own criticality information. It is not allowed to assign different criticality values to the repetitions. This is usable only for repeatable IEs.

9.1.2.3 Range

The Range column indicates the allowed number of copies of repetitive IEs/IE groups.

9.1.2.4 Assigned Criticality

This column provides the actual criticality information as defined in chapter 10.3.2, if applicable.

9.1.3 RAB ASSIGNMENT REQUEST

This message is sent by the CN to request the establishment, modification or release of one or more RABs for the same UE.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs To Be Setup Or Modified	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>First Setup Or Modify Item	M			Grouping reason: same criticality	YES	reject
>>RAB ID	M		9.2.1.2	The same RAB ID must only be present in one group.	-	
>>NAS Synchronisation Indicator	C-ifModifandNASInfoProvided		9.2.3.18		-	
>>RAB Parameters	C - ifSetuporNewValues		9.2.1.3	Includes all necessary parameters for RABs (both for MSC and SGSN) including QoS.	-	
>>User Plane Information	C - ifSetup				-	
>>>User Plane Mode	M		9.2.1.18		-	
>>>UP Mode Versions	M		9.2.1.19		-	
>>Transport Layer Information	C- ifNot OnlyNSI				-	
>>>Transport Layer Address	M		9.2.2.1		-	
>>>Iu Transport Association	M		9.2.2.2		-	
>>Service Handover	O		9.2.1.41		-	
>Second Setup Or Modify Item	M			Grouping reason: same criticality	YES	ignore
>> PDP Type Information	C – ifPSandSetup		9.2.1.40		-	
>>Data Volume Reporting Indication	C – ifPSandSetup		9.2.1.17		-	
>>DL GTP-PDU Sequence Number	C-ifAvailPSandSetup		9.2.2.3		-	
>>UL GTP-PDU Sequence Number	C-ifAvailPSandSetup		9.2.2.4		-	
>>DL N-PDU Sequence Number	C-ifAvailPSandSetup		9.2.1.33		-	
>>UL N-PDU Sequence Number	C-ifAvailPSandSetup		9.2.1.34		-	
RABs To Be Released	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
				RAB ID must only be present in one group.		
>Cause	M		9.2.1.4		-	

Condition	Explanation
IfPSandSetup	This IE is only present for RABs towards the PS domain at RAB establishment.
IfAvailPSandSetup	This IE is only present when available for RABs towards the PS domain at RAB establishment.
IfNoOtherGroup	This group must be present at least when no other group is present, i.e. at least one group must be present.
IfModifandNASInfoProvided	This IE is present at a RAB modification if the relevant NAS information is provided by the CN.
IfSetup	This IE or IE group is present only at a RAB establishment.
IfSetuporNewValue	This IE or IE group is present at a RAB establishment or when any previously set value shall be modified at a RAB modification.
IfNotOnlyNSI	This IE group must not be present if the only other IEs included at a RAB modification are the RAB ID and the NAS Syncronisation Indicator.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.4 RAB ASSIGNMENT RESPONSE

This message is sent by the RNC to report the outcome of the request from the RAB ASSIGNMENT REQUEST message.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Setup Or Modified	C - ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same RAB ID must only be present in one group.	-	
>Transport Layer Address	C - ifPS		9.2.2.1		-	
>Iu Transport Association	C - ifPS		9.2.2.2		-	
>Data Volume	C – ifModReqPS	0 to <maxnoofVol>			-	
>>Unsuccessfully Transmitted DL Data Volume	M		9.2.3.12		-	
>>Data Volume Reference	O		9.2.3.13		-	
RABs Released	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same RAB ID must only be present in one group.	-	
>Data Volume	C – ifReqPS	0 to <maxnoofVol>			-	
>>Unsuccessfully Transmitted DL Data Volume	M		9.2.3.12		-	
>>Data Volume Reference	O		9.2.3.13		-	
>DL GTP-PDU Sequence Number	C-ifAvailUiPS		9.2.2.3		-	
>UL GTP-PDU Sequence Number	C-ifAvailUiPS		9.2.2.4		-	
RABs Queued	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same RAB ID must only be present in one group.	-	
RABs Failed To Setup Or Modify	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same RAB ID must only be present in one group.	-	
>Cause	M		9.2.1.4		-	
RABs Failed To Release	C – ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2	The same RAB ID must only be present in	-	

				one group.		
>Cause	M		9.2.1.4.		-	
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfPS	This IE is only present for RABs towards the PS domain.
IfNoOtherGroup	This group must be present at least when no other group is present, i.e. at least one group must be present.
IfReqPS	This IE is only present if data volume reporting for PS domain is required.
IfModReqPS	This IE is only present if the RAB has been modified and the data volume reporting for PS domain is required.
IfAvailUiPS	This IE is only present for RABs towards the PS domain when available and when the release was initiated by UTRAN.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.
maxnoofVol	Maximum no. of reported data volume for one RAB. Value is 2.

9.1.5 RAB RELEASE REQUEST

This message is sent by the RNC, to request the CN to release one or more RABs for the same UE.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs To Be Released		1 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Cause	M		9.2.1.4		-	

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.6 IU RELEASE REQUEST

This message is sent by the RNC to request the CN to release the Iu connection.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore

9.1.7 IU RELEASE COMMAND

This message is sent by the CN to order RNC to release all resources related to the Iu connection.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore

9.1.8 IU RELEASE COMPLETE

This message is sent by the RNC as response to the IU RELEASE COMMAND message.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Data Volume Report	C – ifReqPS	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Data Volume		1 to <maxnoofVol>			-	
>>Unsuccessfully Transmitted DL Data Volume	M		9.2.3.12		-	
>>Data Volume Reference	O		9.2.3.13		-	
RABs Released	C-ifAvailUiPS	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>DL GTP-PDU Sequence Number	C – ifAvail		9.2.2.3		-	
>UL GTP-PDU Sequence Number	C – ifAvail		9.2.2.4		-	
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfReqPS	This Group is only present if data volume reporting for PS domain is required.
IfAvailUiPS	This group is only present for RABs towards the PS domain when sequence numbers are available and when the release was initiated by UTRAN.
IfAvail	This IE is only present when available

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.
maxnoofVol	Maximum no. of reported data volume for one RAB. Value is 2.

9.1.9 RELOCATION REQUIRED

This message is sent by the source RNC to inform the CN that a relocation is to be performed.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Relocation Type	M		9.2.1.23		YES	ignore
Cause	M		9.2.1.4		YES	ignore
Source ID	M		9.2.1.24		YES	ignore
Target ID	M		9.2.1.25		YES	reject
MS Classmark 2	C – ifGSMtarget		9.2.1.26	Defined in [8].	YES	ignore
MS Classmark 3	C – ifGSMtarget		9.2.1.27	Defined in [8].	YES	ignore
Source RNC To Target RNC Transparent Container	C – ifUMTStarget		9.2.1.28		YES	reject
Old BSS To New BSS Information	C – ifGSMtarget		9.2.1.29	Defined in [11].	YES	ignore

Condition	Explanation
ifGSMtarget	This IE is only present when initiating an inter-system handover towards GSM BSS.
ifUMTStarget	This IE shall be present when initiating relocation of SRNS.

9.1.10 RELOCATION REQUEST

This message is sent by the CN to request the target RNC to allocate necessary resources for a relocation.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Permanent NAS UE Identity	C – ifAvail		9.2.3.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Source RNC To Target RNC Transparent Container	M		9.2.1.28		YES	reject
RABs To Be Setup		0 to <maxnoofRABs>			EACH	reject
>RAB ID	M		9.2.1.2		-	
>NAS Synchronisation Indicator	C – ifNASInfoProvided		9.2.3.18		-	
>RAB Parameters	M		9.2.1.3		-	
>Data Volume Reporting Indication	C – ifPS		9.2.1.17		-	
> PDP Type Information	C – ifPS		9.2.1.40		-	
>User Plane Information	M				-	
>>User Plane Mode	M		9.2.1.18		-	
>>UP Mode Versions	M		9.2.1.19		-	
>Transport Layer Address	M		9.2.2.1		-	
>Iu Transport Association	M		9.2.2.2		-	
>Service Handover	O		9.2.1.41		-	
Integrity Protection Information	C – ifAvail		9.2.1.11	Integrity Protection Information includes key and permitted algorithms.	YES	ignore
Encryption Information	O		9.2.1.12	Encryption Information includes key and permitted algorithms.	YES	ignore
Iu Signalling Connection Identifier	M		9.2.1.38		YES	ignore

Condition	Explanation
IfAvail	This IE is only present if available at the sending side.
IfPS	This IE is only present for RABs towards the PS domain.
IfNASInfoProvided	This IE is present if the relevant NAS information is provided by the CN.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.11 RELOCATION REQUEST ACKNOWLEDGE

This message is sent by the target RNC to inform the CN about the result of the resource allocation for the requested relocation.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	**ignore**
Target RNC To Source RNC Transparent Container	C – IfApplNotOtherCN		9.2.1.30		YES	ignore
RABs Setup		0 to <maxnoofRABs			EACH	reject
>RAB ID	M		9.2.1.2		-	
>Transport Layer Address	C – ifPS		9.2.2.1		-	
>Iu Transport Association	C – ifPS		9.2.2.2			
RABs Failed To Setup		0 to <maxnoofRABs			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Cause	M		9.2.1.4		-	
Chosen Integrity Protection Algorithm	C - ifAvail		9.2.1.13	Indicates which algorithm that will be used by the target RNC.	YES	ignore
Chosen Encryption Algorithm	O		9.2.1.14	Indicates which algorithm that will be used by the target RNC.	YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfPS	This Group is only present for RABs towards the PS domain.
IfApplNotOtherCN	Must be included if applicable and if not sent via the other CN domain.
IfAvail	This IE is only present if available at the sending side.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.12 RELOCATION COMMAND

This message is sent by the CN to source RNC to inform that resources for the relocation are allocated in target RNC.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Target RNC To Source RNC Transparent Container	C - ifRecdFromRelocTarget		9.2.1.30		YES	reject
L3 Information	C - ifRecdFromRelocTarget		9.2.1.31	Defined in [11].	YES	ignore
RABs To Be Released		0 to <maxnoofRABs			EACH	ignore
>RAB ID	M		9.2.1.2		-	
RABs Subject To Data Forwarding	C - ifPS	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Transport Layer Address	M		9.2.2.1		-	
>Iu Transport Association	M		9.2.2.2		-	
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfRecdFromRelocTarget	This IE shall be included if it is received by the CN from the relocation target.
IfPS	This Group is only present for RABs towards the PS domain.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.13 RELOCATION DETECT

This message is sent by the target RNC to inform the CN that the relocation execution trigger has been received.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore

9.1.14 RELOCATION COMPLETE

This message is sent by the target RNC to inform the CN that the relocation is completed.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore

9.1.15 RELOCATION PREPARATION FAILURE

This message is sent by the CN to the source RNC if the relocation preparation failed.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

9.1.16 RELOCATION FAILURE

This message is sent by the target RNC to inform the CN that the requested resource allocation failed.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

9.1.17 RELOCATION CANCEL

This message is sent by the source RNC to the CN to cancel an ongoing relocation.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore

9.1.18 RELOCATION CANCEL ACKNOWLEDGE

This message is sent by the CN to the source RNC when the relocation has been cancelled.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

9.1.19 SRNS CONTEXT REQUEST

This message is sent by the CN to source RNC to indicate the PS RABs for which context transfer shall be performed.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Subject To Data Forwarding		1 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.20 SRNS CONTEXT RESPONSE

This message is sent by the source RNC as a response to SRNS CONTEXT REQUEST message.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Contexts	C - ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>DL GTP-PDU Sequence Number	C - ifAvail		9.2.2.3		-	
>UL GTP-PDU Sequence Number	C - ifAvail		9.2.2.4		-	
>DL N-PDU Sequence Number	C - ifAvail		9.2.1.33		-	
>UL N-PDU Sequence Number	C - ifAvail		9.2.1.34		-	
RABs Contexts Failed To Transfer	C - ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Cause	M		9.2.1.4		-	
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfNoOtherGroup	This group must be present at least when no other group is present, i.e. at least one group must be present.
IfAvail	This IE is only present when available

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.21 SRNS DATA FORWARD COMMAND

This message is sent by the CN to the RNC to trigger the transfer of N-PDUs from the RNC to the CN in inter-system forward handover.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Subject To Data Forwarding	C - ifPS	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Transport Layer Address	M		9.2.2.1		-	
>Iu Transport Association	M		9.2.2.2		-	

Condition	Explanation
ifPS	This Group is only present for RABs towards the PS domain.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.22 FORWARD SRNS CONTEXT

This message is sent either by source RNC to the CN or by the CN to target RNC.

Direction: CN → RNC and RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RAB Contexts		1 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>DL GTP-PDU Sequence Number	C - ifAvail		9.2.2.3		-	
>UL GTP-PDU Sequence Number	C - ifAvail		9.2.2.4		-	
>DL N-PDU Sequence Number	C - ifAvail		9.2.1.33		-	
>UL N-PDU Sequence Number	C - ifAvail		9.2.1.34		-	

Condition	Explanation
IfAvail	This IE is only present when available

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.23 PAGING

This message is sent by the CN to request UTRAN to page a specific UE.

Direction: CN → RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Permanent NAS UE Identity	M		9.2.3.1		YES	ignore
Temporary UE Identity	O		9.2.3.2		YES	ignore
Paging Area ID	O		9.2.1.21		YES	ignore
Paging Cause	O		9.2.3.3		YES	ignore
Non Searching Indication	O		9.2.1.22		YES	ignore
DRX Cycle Length Coefficient	O		9.2.1.37		YES	ignore

9.1.24 COMMON ID

This message is sent by the CN to inform RNC about the permanent NAS UE identity for a user.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Permanent NAS UE Identity	M		9.2.3.1		YES	ignore

9.1.25 CN INVOKE TRACE

This message is sent by the CN to request the RNC to start to produce a trace record.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Trace Type	M		9.2.1.6		YES	ignore
Trace Reference	M		9.2.1.8		YES	ignore
Trigger ID	O		9.2.1.7		YES	ignore
UE Identity	O		9.2.1.9		YES	ignore
OMC ID	O		9.2.1.10		YES	ignore

9.1.26 SECURITY MODE COMMAND

This message is sent by the CN to trigger the integrity and ciphering functions over the radio interface.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Integrity Protection Information	M		9.2.1.11	Integrity information includes key and permitted algorithms.	YES	ignore
Encryption Information	O		9.2.1.12	Encryption information includes key and permitted algorithms.	YES	ignore
Key Status	M		9.2.1.36		YES	ignore

9.1.27 SECURITY MODE COMPLETE

This message is sent by the RNC as a successful response to SECURITY MODE COMMAND message.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Chosen Integrity Protection Algorithm	M		9.2.1.13		YES	ignore
Chosen Encryption Algorithm	O		9.2.1.14		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

9.1.28 SECURITY MODE REJECT

This message is sent by the RNC as a unsuccessful response to SECURITY MODE COMMAND message.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

9.1.29 LOCATION REPORTING CONTROL

This message is sent by the CN to initiate, modify or stop location reporting from the RNC to the CN.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Request Type	M		9.2.1.16		YES	ignore

9.1.30 LOCATION REPORT

This message is sent by the RNC to the CN with information about the UE location.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Area Identity	O		9.2.3.10		YES	ignore
Cause	O		9.2.1.4		YES	ignore
Request Type	C – ifReqTypeNS		9.2.1.16		YES	ignore

Condition	Explanation
IfReqTypeNS	This IE shall be present when *Cause* IE is present and has value "Requested Report Type not supported"

9.1.31 DATA VOLUME REPORT REQUEST

This message is sent by the CN to request unsuccessfully transmitted data volumes for specific RABs.

Direction: CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Data Volume Report		1 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.32 DATA VOLUME REPORT

This message is sent by the RNC and informs the CN about unsuccessfully transmitted data volumes for requested RABs.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
RABs Data Volume Report	C - ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Data Volume		0 to <maxnoofVol>			-	
>>Unsuccessfully Transmitted DL Data Volume	M		9.2.3.12		-	
>>Data Volume Reference	O		9.2.3.13		-	
RABs Failed To Report	C - ifNoOtherGroup	0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>Cause	M		9.2.1.4		-	
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfNoOtherGroup	This group must be present at least when no other group is present, i.e. at least one group must be present.

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.
maxnoofVol	Maximum no. of reported data volume for one RAB. Value is 2.

9.1.33 INITIAL UE MESSAGE

This message is sent by the RNC to transfer the radio interface initial layer 3 message to the CN.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
LAI	M		9.2.3.6		YES	ignore
RAC	C - ifPS		9.2.3.7		YES	ignore
SAI	M		9.2.3.9		YES	ignore
NAS-PDU	M		9.2.3.5		YES	ignore
Iu Signalling Connection Identifier	M		9.2.1.38		YES	ignore
Global RNC-ID	M		9.2.1.39		YES	ignore

Condition	Explanation
ifPS	This IE is only present for RABs towards the PS domain.

9.1.34 DIRECT TRANSFER

This message is sent by both the CN and the RNC and is used for carrying NAS information over the Iu interface.

Direction: RNC → CN and CN → RNC.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
NAS-PDU	M		9.2.3.5		YES	ignore
LAI	C – ifPS2CN		9.2.3.6		YES	ignore
RAC	C – ifPS2CN		9.2.3.7		YES	ignore
SAI	C – ifPS2CN		9.2.3.9		YES	ignore
SAPI	C – ifDL		9.2.3.8		YES	ignore

Condition	Explanation
IfPS2CN	This IE is only present if the message is directed to the PS domain in uplink direction.
IfDL	This IE is always used in downlink direction.

9.1.35 CN INFORMATION BROADCAST REQUEST

Void

9.1.36 CN INFORMATION BROADCAST CONFIRM

Void

9.1.37 CN INFORMATION BROADCAST REJECT

Void

9.1.38 OVERLOAD

This message is sent by both the CN and the RNC to indicate that the node is overloaded.

Direction: RNC → CN and CN → RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Number Of Steps	O		9.2.1.32		YES	ignore
Global RNC-ID	C- ifUL		9.2.1.39		YES	ignore

Condition	Explanation
IfUL	This IE is always used in uplink direction

9.1.39 RESET

This message is sent by both the CN and the RNC and is used to request that the other node shall be reset.

Direction: RNC → CN and CN → RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	M		9.2.1.4		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Global RNC-ID	C - ifUL		9.2.1.39		YES	ignore

Condition	Explanation
IfUL	This IE is always used in uplink direction

9.1.40 RESET ACKNOWLEDGE

This message is sent by both the CN and the RNC as a response to RESET message.

Direction: RNC → CN and CN → RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore
Global RNC-ID	C - ifUL		9.2.1.39		YES	ignore

Condition	Explanation
IfUL	This IE is always used in uplink direction

9.1.41 ERROR INDICATION

This message is sent by both the CN and the RNC and is used to indicate that some error has been detected in the node.

Direction: RNC → CN and CN → RNC.

Signalling bearer mode: Connection oriented or connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Cause	C - ifalone		9.2.1.4		YES	ignore
Criticality Diagnostics	C - ifalone		9.2.1.35		YES	ignore
CN Domain Indicator	O		9.2.1.5		YES	ignore
Global RNC-ID	C – ifULandCL		9.2.1.39		YES	ignore

Condition	Explanation
ifalone	At least either Cause IE or Criticality Diagnostics IE shall be present.
ifULandCL	This IE is always used in uplink direction when message is sent connectionless

9.1.42 CN DEACTIVATE TRACE

This message is sent by the CN to request the RNC to stop producing a trace record for the indicated trace reference.

Direction: CN → RNC.

Signalling bearer mode: Connection Oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Trace Reference	M		9.2.1.8		YES	ignore
Trigger ID	O		9.2.1.7		YES	ignore

9.1.43 RANAP RELOCATION INFORMATION

This message is part of a special RANAP Relocation Information procedure, and is sent between RNCs during Relocation.

Direction: RNC - RNC.

Signalling bearer mode: Not applicable.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Direct Transfer Information		0 to <maxnoofDT>		Information received in one or more DIRECT TRANSFER messages and that needs to be transferred to target RNC for further transmission to the UE.	EACH	ignore
>NAS-PDU	M		9.2.3.5		-	
>SAPI	M		9.2.3.8		-	
>CN Domain Indicator	M		9.2.1.5		-	
RAB Contexts		0 to <maxnoofRABs>			EACH	ignore
>RAB ID	M		9.2.1.2		-	
>DL GTP-PDU Sequence Number	C - ifAvail		9.2.2.3		-	
>UL GTP-PDU Sequence Number	C - ifAvail		9.2.2.4		-	
>DL N-PDU Sequence Number	C - ifAvail		9.2.1.33		-	
>UL N-PDU Sequence Number	C - ifAvail		9.2.1.34		-	

Condition	Explanation
IfAvail	This IE is only present when available

Range bound	Explanation
maxnoofDT	Maximum no. of DT information. Value is 15.
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.

9.1.44 RESET RESOURCE

This message is sent by either CN or RNC. The sending entity informs the receiving entity that the sending requests the receiving entity to release resources and references associated to Iu signalling connection identifiers in the message.

Direction: CN ←→ RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Cause	M		9.2.1.4		YES	ignore
Iu Signalling Connections To Be Released		1 to <maxnoofIuSigConIds			EACH	ignore
>Iu Signalling Connection Identifier	M		9.2.1.38		-	
Global RNC-ID	C - ifUL		9.2.1.39		YES	ignore

Condition	Explanation
IfUL	This IE is always used in uplink direction

Range bound	Explanation
maxnoofIuSigConIds	Maximum no. of Iu signalling connection identifiers. Value is 250.

9.1.45 RESET RESOURCE ACKNOWLEDGE

This message is sent by either the CN or RNC inform the CN or RNC that the RESET RESOURCE message has been received.

Direction: CN ←→ RNC.

Signalling bearer mode: Connectionless.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
CN Domain Indicator	M		9.2.1.5		YES	ignore
Iu Signalling Connections Released		1 to <maxnoofIuSigConIds		This list shall be in the same order as the list received in the RESET RESOURCE message.	EACH	ignore
>Iu Signalling Connection Identifier	M		9.2.1.38		-	
Global RNC-ID	C - ifUL		9.2.1.39		YES	ignore
Criticality Diagnostics	O		9.2.1.35		YES	ignore

Condition	Explanation
IfUL	This IE is always used in uplink direction

Range bound	Explanation
maxnoofIuSigConIds	Maximum no. of Iu signalling connection identifiers. Value is 250.

9.2 Information Element Definitions

9.2.0 General

Section 9.2 presents the RANAP IE definitions in tabular format. The corresponding ASN.1 definition is presented in section 9.3. In case there is contradiction between the tabular format in section 9.2 and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, where the tabular format shall take precedence.

9.2.1 Radio Network Layer Related IEs

9.2.1.1 Message Type

Message Type IE uniquely identifies the message being sent. It is mandatory for all messages.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Message Type				Assumed max no of messages is 256.
>Procedure Code	M		ENUMERATED (RAB Assignment, RAB Release Request, Iu Release Request, Iu Release, Relocation Preparation, Relocation Resource Allocation, Relocation Detect, Relocation Complete Relocation Cancel, SRNS Context Transfer, SRNS Data Forwarding Initiation, SRNS Context Forwarding from Source RNC to CN, SRNS Context Forwarding to Target RNC from CN, Paging, Common ID, CN Invoke Trace, Security Mode Control, Location Reporting Control Location Report, Data Volume Report, Initial UE Message Direct Transfer, Overload Control, Reset, Error Indication, CN Deactivate Trace, RANAP Relocation Information, Reset Resource, Reset Resource Acknowledge, …)	
>Type of Message	M		ENUMERATED (Initiating Message, Successful Outcome, Unsuccessful Outcome, Outcome)	

9.2.1.2 RAB ID

This element uniquely identifies the radio access bearer for a specific CN domain for a particular UE, which makes the RAB ID unique over one Iu connection. The RAB ID shall remain the same for the duration of the RAB even when the RAB is relocated to another Iu connection.

The purpose of the element is to bind data stream from the Non-Access Stratum point of view (e.g. bearer of call or PDP context) and radio access bearer in Access Stratum. The value is also used in the RNC to relate Radio Bearers to a RAB. The content of this information element is transferred unchanged from the CN node (i.e., MSC or SGSN) via RNC to UE by RANAP messages and RRC messages. For RRC messages refer to [10].

The element contains binary representation of either the Stream Identifier (SI) for CS domain or the Network Service Access Point Identifier (NSAPI) for PS domain. These identifiers are coded in the RAB ID element in accordance with the coding of the *Stream Identifier* IE and with the coding of the *NSAPI* IE in [8].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB ID	M		BIT STRING (8)	

9.2.1.3 RAB Parameters

The purpose of the *RAB parameters* IE group and other parameters within the *RAB parameters* IE group is to indicate all RAB attributes as defined in [7] for both directions.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Traffic Class	M		ENUMERATED (conversational, streaming, interactive, background, ...)	**Desc.:** This IE indicates the type of application for which the Radio Access Bearer service is optimised
>RAB Asymmetry Indicator	M		ENUMERATED (Symmetric bidirectional, Asymmetric Uni directional downlink, Asymmetric Uni directional Uplink, Asymmetric Bidirectional, ...)	**Desc.:** This IE indicates asymmetry or symmetry of the RAB and traffic direction
>Maximum Bit Rate	M	1 to <nbr-SeparateTrafficDirections>	INTEGER (1..16,000,000)	**Desc.:** This IE indicates the maximum number of bits delivered by UTRAN and to UTRAN at a SAP within a period of time, divided by the duration of the period. The unit is: bit/s **Usage**: When nbr-SeparateTrafficDirections is equal to 2, then Maximum Bit Rate attribute for downlink is signalled first, then Maximum Bit Rate attribute for uplink
>Guaranteed Bit Rate	C-iftrafficConv-Stream	0 to <nbr-SeparateTrafficDirections>	INTEGER (0..16,000,000)	**Desc.:** This IE indicates the guaranteed number of bits delivered at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The unit is: bit/s **Usage:** 1. When nbr-SeparateTrafficDirections is equal to 2, then Guaranteed Bit Rate for downlink is signalled first, then Guaranteed Bit Rate for uplink 2. Delay and reliability attributes only apply up to the guaranteed bit rate 3. Conditional value: • Set to lowest rate controllable RAB Subflow Combination rate given by the largest RAB Subflow Combination SDU size, when present and calculated Iu Transmission Interval

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
				•
>Delivery Order	M		ENUMERATED (delivery order requested, delivery order not requested)	**Desc:** This IE indicates that whether the RAB shall provide in-sequence SDU delivery or not **Usage:** Delivery order requested: in sequence delivery shall be guaranteed by UTRAN on all RAB SDUs Delivery order not requested: in sequence delivery is not required from UTRAN
>Maximum SDU Size	M		INTEGER (0..32768)	**Desc.:** This IE indicates the maximum allowed SDU size The unit is: bit. **Usage:** Conditional value: set to largest RAB Subflow Combination compound SDU size when present among the different RAB Subflow Combination
> SDU parameters		1 to <maxRABSubflows>	See below	**Desc.:** This IE contains the parameters characterizing the RAB SDUs **Usage** Given per subflow with first occurence corresponding to subflow#1 etc…
>Transfer Delay	C-iftrafficConv-Stream		INTEGER (0..65535)	**Desc.:** This IE indicates the maximum delay for 95th percentile of the distribution of delay for all delivered SDUs during the lifetime of a RAB, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP The unit is: millisecond. **Usage:** -
>Traffic Handling Priority	C - iftrafficInteractiv		INTEGER {spare (0), highest (1), lowest (14), no priority used (15)} (0…15)	**Desc.:** This IE specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers **Usage:** -
>Allocation/Retention priority	O		See below	**Desc.:** This IE specifies the relative importance compared to other Radio access bearers for allocation and retention of the Radio access bearer. **Usage:** If this IE is not received, the request is regarded as it cannot trigger the pre-emption process and it is vulnerable to the pre-emption process.
>Source Statistics Descriptor	C-iftrafficConv-Stream		ENUMERATED (speech, unknown, …)	**Desc.:** This IE specifies characteristics of the source of submitted SDUs **Usage:** -
>Relocation Requirement	C-ifPS		ENUMERATED (lossless, none, …)	**Desc.:** This IE specifies in which way the radio access bearer shall be treated in case of relocation **Usage:** Lossless : lossless relocation is required for this RAB

Range Bound	Explanation
nbr-SeparateTrafficDirection	Number of Traffic Directions being signalled separately. Set to 2 if RAB asymmetry indicator is asymmetric bidirectional. Set to 1 in all other cases.

Range Bound	Explanation
maxRABSubflows	Number of RAB Subflows

Condition	Explanation
IftrafficConv-Stream	This IE is only present when traffic class indicates “Conversational” or “Streaming”
IftrafficInteractiv	This IE is only present when traffic class indicates “Interactive”
IfPS	This IE is only present for RABs towards the PS domain.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SDU parameters				
>SDU Error Ratio	C-ifErroneousSDU			**Desc.:** This IE indicates the fraction of SDUs lost or detected as erroneous. This is a Reliability attribute **Usage:** The attribute is coded as follows: Mantissa * $10^{-\text{exponent}}$
>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..6)	
>Residual Bit Error Ratio	M			**Desc.:** This IE indicates the undetected bit error ratio for each subflow in the delivered SDU. This is a Reliability attribute. **Usage:** The attribute is coded as follows: Mantissa * $10^{-\text{exponent}}$
>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..8)	
>Delivery Of Erroneous SDU	M		ENUMERATED (yes, no, no-error-detection-consideration)	**Desc.:** This IE indicates whether SDUs with detected errors shall be delivered or not. In case of unequal error protection, the attribute is set per subflow This is a Reliability attribute **Usage:** Yes: error detection applied, erroneous SDU delivered No. Error detection is applied , erroneous SDU discarded no-error-detection-consideration: SDUs delivered without considering error detection
>SDU format information Parameter	C - ifratecontrollableRAB	1 to <maxRABSubflowCombinations>	See below	**Desc.:** This IE contains the list of possible exact sizes of SDUs and/or RAB Subflow Combination bit rates

Range Bound	Explanation
maxRABSubflowCombination	Number of RAB Subflow Combination

Condition	Explanation
IfErroneousSDU	This IE is not present when Delivery Of Erroneous SDU is set to "no-error-detection-consideration "
IfratecontrollableRAB	When signalled, this IE indicates that the RAB is rate controllable

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SDU Format Information Parameter				
>Subflow SDU Size	C-ifalone		INTEGER (0…4095)	**Desc.:** This IE indicates the exact size of the SDU. The unit is: bit. **Usage:** This IE is only used for RABs that have predefined SDU size(s). It shall be present for RABs having more than one subflow. When this IE is not present and SDU format information Parameter is present, then the Subflow SDU size for the only existing subflow takes the value of Maximum SDU size.
>RAB Subflow Combination Bit Rate	C-ifalone		INTEGER (0..16,000,000)	**Desc.**: This IE indicates the RAB Subflow Combination bit rate. The unit is: bit/s. **Usage:** This IE is only present for RABs that have predefined rate controllable bit rates. When this IE is not present and SDU format information parameter is present then all Subflow SDUs are transmitted (when there is data to be transmitted) at a constant time interval. The value of this IE shall not exceed the maximum value of the IEs 'Maximum Bit Rate'. The value 0 of RAB Subflow Combination bitrate indicates that the RAB uses discontinuous transfer of the SDUs.

Condition	Explanation
Ifalone	At least either of Subflow SDU size IE or RAB Subflow Combination bit rate IE shall be present when SDU format information parameter is present

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Allocation/Retention Priority				
>Priority Level	M		INTEGER {spare (0), highest (1), lowest (14), no priority used (15)} (0..15)	**Desc.**: This IE indicates the priority of the request. **Usage:** The priority level and the preemption indicators may be used to determine whether the request has to be performed unconditionally and immediately
>Pre-emption Capability	M		ENUMERATED(shall not trigger pre-emption, may trigger pre-emption)	**Descr.:** This IE indicates the pre-emption capability of the request on other RABs **Usage:** The RAB shall not pre-empt other RABs or, the RAB may pre-empt other RABs The Pre-emption Capability indicator applies to the allocation of resources for a RAB and as such it provides the trigger to the pre-emption procedures/processes of the RNS.
>Pre-emption Vulnerability	M		ENUMERATED(not pre-emptable, pre-emptable)	**Desc.:** This IE indicates the vulnerability of the RAB to preemption of other RABs. **Usage**: The RAB shall not be pre-empted by other RABs or the RAB may be pre-empted by other RABs. Pre-emption Vulnerability indicator applies for the entire duration of the RAB, unless modified and as such indicates whether the RAB is a target of the pre-emption procedures/processes of the RNS
>Queuing Allowed	M		ENUMERATED(queuing not allowed, queuing allowed)	**Desc.:** This IE indicates whether the request can be placed into a resource allocation queue or not. **Usage:** Queuing of the RAB is allowed Queuing of the RAB is not allowed Queuing allowed indicator applies for the entire duration of the RAB, unless modified.

9.2.1.4 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the RANAP protocol.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
>Radio Network Layer Cause			INTEGER (RAB pre-empted(1), Trelocoverall Expiry(2), Trelocprep Expiry(3), Treloccomplete Expiry(4), Tqueing Expiry(5), Relocation Triggered(6), Unable to Establish During Relocation(8), Unknown Target RNC(9), Relocation Cancelled(10), Successful Relocation(11), Requested Ciphering and/or Integrity Protection Algorithms not Supported(12), Change of Ciphering and/or Integrity Protection is not supported(13), Failure in the Radio Interface Procedure(14), Release due to UTRAN Generated Reason(15), User Inactivity(16), Time Critical Relocation(17), Requested Traffic Class not Available(18), Invalid RAB Parameters Value(19), Requested Maximum Bit Rate not Available(20), Requested Maximum Bit Rate for DL not Available(33),	Value range is 1 – 64.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			Requested Maximum Bit Rate for UL not Available(34), Requested Guaranteed Bit Rate not Available(21), Requested Guaranteed Bit Rate for DL not Available(35), Requested Guaranteed Bit Rate for UL not Available(36), Requested Transfer Delay not Achievable(22), Invalid RAB Parameters Combination(23), Condition Violation for SDU Parameters(24), Condition Violation for Traffic Handling Priority(25), Condition Violation for Guaranteed Bit Rate(26), User Plane Versions not Supported(27), Iu UP Failure(28), TRELOCalloc Expiry (7), Relocation Failure in Target CN/RNC or Target System (29), Invalid RAB ID(30), No remaining RAB(31), Interaction with other procedure(32), Repeated Integrity Checking Failure(37), Requested Report Type not supported(38), Request superseded(39), Release due to UE generated signalling connection release(40), Resource	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			Optimisation Relocation(41), Requested Information Not Available(42), Relocation desirable for radio reasons (43), Relocation not supported in Target RNC or Target system(44), Directed Retry (45), Radio Connection With UE Lost(46) …)	
>Transport Layer Cause			INTEGER (Signalling Transport Resource Failure(65), Iu Transport Connection Failed to Establish(66), …)	Value range is 65 – 80.
>NAS Cause			INTEGER (User Restriction Start Indication(81), User Restriction End Indication(82), Normal Release(83), …)	Value range is 81 – 96.
>Protocol Cause			INTEGER (Transfer Syntax Error(97), Semantic Error (98), Message not compatible with receiver state (99), Abstract Syntax Error (Reject) (100), Abstract Syntax Error (Ignore and Notify) (101), Abstract Syntax Error (Falsely Constructed Message) (102), …)	Value range is 97 – 112.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
>Miscellaneous Cause			INTEGER (O&M Intervention(113), No Resource Available(114), Unspecified Failure(115), Network Optimisation(116), …)	Value range is 113 – 128.
>Non-standard Cause			INTEGER (…)	Value range is 129 – 256.

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the concerning capability is missing. On the other hand, "not available" cause values indicate that the concerning capability is present, but insufficient resources were available to perform the requested action.

Radio Network Layer cause	Meaning
Change Of Ciphering And/Or Integrity Protection Is Not Supported	The UTRAN and/or the UE are/is unable to support the requested change of ciphering and/or integrity protection algorithms.
Condition Violation For Guaranteed Bit Rate	The action was not performed due to condition violation for guaranteed bit rate.
Condition Violation For SDU Parameters	The action was not performed due to condition violation for SDU parameters.
Condition Violation For Traffic Handling Priority	The action was not performed due to condition violation for traffic handling priority.
Directed Retry	The reason for action is Directed Retry
Failure In The Radio Interface Procedure	Radio interface procedure has failed.
Interaction With Other Procedure	Relocation was cancelled due to interaction with other procedure.
Invalid RAB ID	The action failed because the RAB ID is unknown in the RNC.
Invalid RAB Parameters Combination	The action failed due to invalid RAB parameters combination.
Invalid RAB Parameters Value	The action failed due to invalid RAB parameters value.
Iu UP Failure	The action failed due to Iu UP failure.
No remaining RAB	The reason for the action is no remaining RAB.
RAB Pre-empted	The reason for the action is that RAB is pre-empted.
Radio Connection With UE Lost	The action is requested due to losing radio connection to the UE
Release Due To UE Generated Signalling Connection Release	Release requested due to UE generated signalling connection release.
Release Due To UTRAN Generated Reason	Release is initiated due to UTRAN generated reason.
Relocation Cancelled	The reason for the action is relocation cancellation.
Relocation Desirable for Radio Reasons	The reason for requesting relocation is radio related.
Relocation Failure In Target CN/RNC Or Target System	Relocation failed due to a failure in target CN/RNC or target system.
Relocation Not Supported In Target RNC Or Target System	Relocation failed because relocation was not supported in target RNC or target system.
Relocation Triggered	The action failed due to relocation.
Repeated Integrity Checking Failure	The action is requested due to repeated failure in integrity checking.
Request Superseded	The action failed because there was a second request on the same RAB.
Requested Ciphering And/Or Integrity Protection Algorithms Not Supported	The UTRAN or the UE is unable to support the requested ciphering and/or integrity protection algorithms.
Requested Guaranteed Bit Rate For DL Not Available	The action failed because requested guaranteed bit rate for DL is not available.
Requested Guaranteed Bit Rate For UL Not Available	The action failed because requested guaranteed bit rate for UL is not available.
Requested Guaranteed Bit Rate Not Available	The action failed because requested guaranteed bit rate is not available.
Requested Information Not Available	The action failed because requested information is not available.
Requested Maximum Bit Rate For DL Not Available	The action failed because requested maximum bit rate for DL is not available.
Requested Maximum Bit Rate For UL Not Available	The action failed because requested maximum bit rate for UL is not available.
Requested Maximum Bit Rate Not Available	The action failed because requested maximum bit rate is not available.
Requested Report Type Not Supported	The RNC is not supporting the requested location report type.
Requested Traffic Class Not Available	The action failed because requested traffic class is not available.
Requested Transfer Delay Not Achievable	The action failed because requested transfer delay is not achievable.
Resource Optimisation Relocation	The reason for requesting relocation is resource optimisation.

Radio Network Layer cause	Meaning
Successful Relocation	The reason for the action is completion of successful relocation.
Time Critical Relocation	Relocation is requested for time critical reason.
$T_{QUEUING}$ Expiry	The action failed due to expiry of the timer $T_{QUEUING}$.
$T_{RELOCalloc}$ Expiry	Relocation Resource Allocation procedure failed due to expiry of the timer $T_{RELOCalloc}$.
$T_{RELOCcomplete}$ Expiry	The reason for the action is expiry of timer $T_{RELOCcomplete}$.
$T_{RELOCoverall}$ Expiry	The reason for the action is expiry of timer $T_{RELOCoverall}$.
$T_{RELOCprep}$ Expiry	Relocation Preparation procedure is cancelled when timer $T_{RELOCprep}$ expires.
Unable To Establish During Relocation	RAB failed to establish during relocation because it cannot be supported in the target RNC.
Unknown Target RNC	Relocation rejected because the target RNC is not known to the CN.
User Inactivity	The action is requested due to user inactivity.
User Plane Versions Not Supported	The action failed because requested user plane versions were not supported.

Transport Layer cause	Meaning
Iu Transport Connection Failed to Establish	The action failed because the Iu Transport Network Layer connection could not be established.
Signalling Transport Resource Failure	Signalling transport resources have failed *(e.g. processor reset).*

NAS cause	Meaning
Normal Release	The release is normal.
User Restriction Start Indication	A location report is generated due to entering a classified area set by O&M.
User Restriction End Indication	A location report is generated due to leaving a classified area set by O&M.

Protocol cause	Meaning
Abstract Syntax Error (Reject)	The received message included an abstract syntax error and the concerning criticality indicated "reject".
Abstract Syntax Error (Ignore And Notify)	The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify".
Abstract Syntax Error (Falsely Constructed Message)	The received message contained IEs or IE groups in wrong order or with too many occurrences.
Message Not Compatible With Receiver State	The received message was not compatible with the receiver state.
Semantic Error	The received message included a semantic error.
Transfer Syntax Error	The received message included a transfer syntax error.

Miscellaneous cause	Meaning
Network Optimisation	The action is performed for network optimisation.
No Resource Available	No requested resource is available.
O&M Intervention	The action is due to O&M intervention.
Unspecified Failure	Sent when none of the specified cause values applies.

9.2.1.5 CN Domain Indicator

Indicates the CN domain from which the message originates or to which the message shall be sent.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CN Domain Indicator	M		ENUMERATED (CS domain, PS domain)	

9.2.1.6 Trace Type

Indicates the type of trace information to be recorded.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Trace Type	M		OCTET STRING (1)	Coded as the Trace Type specified in 3GPP TS based on [12].

9.2.1.7 Trigger ID

Indicates the identity of the entity which initiated the trace.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Trigger ID	M		OCTET STRING (3..22)	Typically an OMC identity.

9.2.1.8 Trace Reference

Provides a trace reference number allocated by the triggering entity.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Trace Reference	M		OCTET STRING (2..3)	

9.2.1.9 UE Identity

This element identifies the element to be traced i.e. the subscriber or the user equipment.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **UE Identity**				
>IMSI			OCTET STRING (SIZE (3..8))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -Number of decimal digits shall be from 6 to 15 starting with the digits from the PLMN-ID.
>IMEI			OCTET STRING (SIZE (8))	- hexadecimal digits 0 to F, two hexadecimal digits per octet, - each hexadecimal digit encoded 0000 to 1111, - 1111 used as filler for bits 8 to 5 of last octet - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n Number of hexadecimal digits shall be 15.

9.2.1.10 OMC ID

A variable length element indicating the destination address of the Operation and Maintenance Center (OMC) to which trace information is to be sent.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
OMC ID	M		OCTET STRING (3..22)	Coded as the OMC ID specified in UMTS TS based on GSM TS 12.20.

9.2.1.11 Integrity Protection Information

This element contains the integrity protection information (key and permitted algorithms).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Integrity Protection Information				
>Permitted Integrity Protection Algorithms				
>>Integrity Protection Algorithm	M	1 to 16	INTEGER (standard UIA1 (0))	Value range is 0 to 15. Only one value used.
>Integrity Protection Key	M		BIT STRING (128)	

9.2.1.12 Encryption Information

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Encryption Information				
>Permitted Encryption Algorithms				
>>Encryption Algorithm	M	1 to 16	INTEGER (no encryption (0), standard UEA1 (1))	Value range is 0 to 15. Only two values used.
>Encryption Key	M		Bit string (128)	

9.2.1.13 Chosen Integrity Protection Algorithm

This element indicates the integrity protection algorithm being used by the RNC.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Chosen Integrity Protection Algorithm	M		INTEGER (standard UIA1 (0))	Value range is 0 to 15. Only one value used.

9.2.1.14 Chosen Encryption Algorithm

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Chosen Encryption Algorithm	M		INTEGER (no encryption (0), standard UEA1 (1))	Value range is 0 to 15. Only two values used.

9.2.1.15 Categorisation Parameters

Void.

9.2.1.16 Request Type

This element indicates the type of UE location to be reported from RNC and it is either a Service Area or geographical co-ordinates.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Request Type				
>Event	M		ENUMERATED(Stop, Direct, Change of service area, ...)	
>Report Area	M		ENUMERATED(Service Area, Geographical Coordinates, ...)	When the Event IE is set to Stop, the value of the Report area IE shall be the same as in the LOCATION REPORTING CONTROL message that initiated "Change of Service Area" reporting.
>Accuracy Code	C – ifGeoCoordandAccuracy		INTEGER(0...127)	The requested accuracy "r" is derived from the "accuracy code" k by $r = 10x(1.1^k-1)$

Condition	Explanation
IfGeoCoordandAccuracy	To be used if Geographical Coordinates shall be reported with a requested accuracy.

9.2.1.17 Data Volume Reporting Indication

This information element indicates whether or not RNC has to calculate the unsuccessfully transmitted NAS data amount for the RAB and to report the amount of data when the RAB is released.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Data Volume Reporting Indication	M		ENUMERATED (do report, do not report)	

9.2.1.18 User Plane Mode

This element indicates the mode of operation of the Iu User plane requested for realising the RAB. The Iu User plane modes are defined in [6].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
User Plane Mode	M		ENUMERATED (transparent mode, support mode for predefined SDU sizes, ...)	This IE contains the mode of operation of the Iu UP protocol

9.2.1.19 UP Mode Versions

UP mode versions IE is an information element that is sent by CN to RNC. It is a bit string that indicates the versions for the selected Iu UP mode that are supported by the CN. The Iu User plane mode versions are defined in [6].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UP Mode Versions	M		BIT STRING (16)	Indicates the versions of the selected UP mode that are supported by the CN Bit 0 set to '1' equals version 1 Bit 1 set to '1' equals version 2 , ...

9.2.1.20 Chosen UP Version

Void.

9.2.1.21 Paging Area ID

This element uniquely identifies the area, where the PAGING message shall be broadcasted. The Paging area ID is either a Location Area ID or Routing Area ID.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Paging Area ID**				
>LAI			9.2.3.6	
>RAI				
>>LAI	M		9.2.3.6	
>>RAC	M		9.2.3.7	

9.2.1.22 Non Searching Indication

This parameter allows the RNC not to search Common ID when receiving a PAGING message from the CN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Non Searching Indication	M		ENUMERATED (non-searching, searching)	

9.2.1.23 Relocation Type

This information element indicates whether the relocation of SRNS is to be executed with or without involvement of the UE. If the UE is involved then a radio interface handover command shall be sent to the UE to trigger the execution of the relocation. If the UE is not involved then the relocation execution is triggered via Iur.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Relocation Type	M		ENUMERATED (UE not involved in relocation of SRNS,UE involved in relocation of SRNS)	

9.2.1.24 Source ID

Source ID IE identifies the source for the relocation of SRNS. The Source ID may be e.g. Source RNC-ID or serving cell ID.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Source ID**				
>Source RNC-ID	C - ifUMTStarget			
>>PLMN-ID	M		OCTET STRING (SIZE (3))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -The PLMN-ID consists of 3 digits from MCC followed by either -a filler plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).
>>RNC-ID	M		INTEGER (0..4095)	
>SAI	C - ifGSMtarget		9.2.3.9	

Condition	Explanation
ifUMTStarget	This IE shall be present when initiating relocation of SRNS.
IfGSMtarget	This IE is only present when initiating an inter-system handover towards GSM BSS.

9.2.1.25 Target ID

Target ID IE identifies the target for the relocation of SRNS. The target ID may be e.g. Target RNC-ID (for UMTS-UMTS relocation) or Cell Global ID of the relocation target (in case of UMTS to GSM relocation).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Target ID**				
>Target RNC-ID				
>>Choice **CN Domain ID**				
>>>CS Domain ID				See ref. [3].
>>>>LAI	M		9.2.3.6	
>>>PS Domain ID				See ref. [3].
>>>>LAI	M		9.2.3.6	
>>>>RAC	M		9.2.3.7	
>>RNC-ID	M		INTEGER (0..4095)	
>CGI				
>>LAI	M		9.2.3.6	
>>CI	M		OCTET STRING (2)	

9.2.1.26 MS Classmark 2

The coding of this element is described in [8].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MS Classmark 2	M		OCTET STRING	Contents defined in [8]

9.2.1.27 MS Classmark 3

The coding of this element is described in [8].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MS Classmark 3	M		OCTET STRING	Contents defined in [8]

9.2.1.28 Source RNC to Target RNC Transparent Container

Source RNC to Target RNC Transparent Container IE is an information element that is produced by source RNC and is transmitted to target RNC. In inter-system relocation the IE is transmitted from external relocation source to target RNC.

This IE is transparent to CN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RRC Container	M		OCTET STRING	"RRC Information to target RNC" as defined in [10]
Number of Iu Instances	M		INTEGER (1...2)	
Relocation Type	M		9.2.1.23	
Chosen Integrity Protection Algorithm	C – ifIntraUMTSandAvail		9.2.1.13	Indicates which integrity protection algorithm that has been used by the source RNC.
Integrity Protection Key	C – ifIntraUMTSandAvail		Bit String (128)	Indicates which integrity protection key that has been used by the source RNC.
Chosen Encryption Algorithm	C - ifIntraUMTSandCiph		9.2.1.14	Indicates which algorithm that has been used by the source RNC for ciphering of signalling data.
Ciphering Key	C - ifIntraUMTSandCiph		Bit String (128)	Indicates which ciphering key that has been used by the source RNC for ciphering of signalling data.
Chosen Encryption Algorithm	C - ifIntraUMTSandCiph		9.2.1.14	Indicates which algorithm that has been used by the source RNC for ciphering of CS user data.
Chosen Encryption Algorithm	C - ifIntraUMTSandCiph		9.2.1.14	Indicates which algorithm that has been used by the source RNC for ciphering of PS user data.
d-RNTI	C - ifUEnotinvolved		INTEGER (0..1048575)	
Target Cell ID	C - ifUEinvolved		INTEGER (0..268435455)	This information element identifies a cell uniquely within UTRAN and consists of RNC-ID (12 bits) and C-ID (16 bits) as defined in TS 25.401 [3].
RAB TrCH Mapping	C – ifUEnotinvolvedandRABsUseDCHorDSCHorUSCH	1 to <maxnoofRABs>		
>RAB ID	M		9.2.1.2	
>**RAB Subflow**	M	1 to <maxRAB-Subflows>		The RAB Subflows shall be presented in an order that corresponds to the order in which the RBs are presented per RAB in the RRC container included in this IE.
>> **Transport Channel IDs**				
>>> DCH ID	C-atleastone		INTEGER (0..255)	The DCH ID is the identifier of an active dedicated transport channel. It is unique for each active DCH among the active DCHs simultaneously allocated for the same UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>> DSCH ID	C-atleastone		INTEGER (0..255)	The DSCH ID is the identifier of an active downlink shared transport channel. It is unique for each DSCH among the active DSCHs simultaneously allocated for the same UE.
>>> USCH ID	C-atleastone		INTEGER (0..255)	The USCH ID is the identifier of an active uplink shared transport channel. It is unique for each USCH among the active USCHs simultaneously allocated for the same UE.

Condition	Explanation
IfIntraUMTSandAvail	Must be present for intra UMTS Handovers if available
IfIntraUMTSandCiph	Must be present for intra UMTS Handovers if ciphering is active
IfUEnotinvolved	Included for SRNS Relocation without UE involvement
IfUEinvolved	Included for SRNS Relocation with UE involvement
IfUEnotinvolvedandRABsUseDCHorDSCHorUSCH	Included for SRNS Relocation without UE involvement and if RABs are carried on DCH, USCH or DSCH transport channels.
AtLeastOne	At least one of these IEs shall be included

Range bound	Explanation
maxnoofRABs	Maximum no. of RABs for one UE. Value is 256.
maxRABSubflows	Maximum no. of subflows per RAB. Value is 7.

9.2.1.29 Old BSS to New BSS Information

The coding of this element is described in [11].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Old BSS To New BSS Information	M		OCTET STRING	Contents defined in [11].

9.2.1.30 Target RNC to Source RNC Transparent Container

Target RNC to Source RNC Transparent Container IE is an information element that is produced by target RNC and is transmitted to source RNC. In inter-system relocation the IE is transmitted from target RNC to the external relocation source.

This IE is transparent to CN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RRC Container	M		OCTET STRING	Either “RRC information, target RNC to source RNC” or “RRC Information, target RNC to source system” as defined in [10]
d-RNTI	O		INTEGER (0..1048575)	May be included to allow the triggering of the Relocation Detect procedure from the Iur Interface

9.2.1.31 L3 Information

The coding of this element is described in [11].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
L3 Information	M		OCTET STRING	Contents defined in [11].

9.2.1.32 Number of Steps

Indicates the number of steps to reduce traffic in overload situation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Number Of Steps	M		INTEGER (1...16)	

9.2.1.33 DL N-PDU Sequence Number

This IE indicates the radio interface sequence number (PDCP) [17] of the next downlink N-PDU (PDCP SDU) that would have been sent to the UE by a source system.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DL N-PDU Sequence Number	M		INTEGER (0 ..65535)	This IE indicates the sequence number of the next DL N-PDU that would have been sent to the UE by a source system. This is the 16 bit sequence number.

9.2.1.34 UL N-PDU Sequence Number

This IE indicates the radio interface sequence number (PDCP) [17] of the next uplink N-PDU (PDCP SDU) that would have been expected from the UE by a source system.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UL N-PDU Sequence Number	M		INTEGER (0 ..65535)	This IE indicates the sequence number of the next UL N-PDU that would have been expected from the UE by a source system. This is the 16 bit sequence number.

9.2.1.35 Criticality Diagnostics

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Criticality Diagnostics				
>Procedure Code	O		INTEGER (0..255)	Procedure Code is to be used if Criticality Diagnostics is part of Error Indication procedure, and not within the response message of the same procedure that caused the error
>Triggering Message	O		ENUMERATED(initiating message, successful outcome, unsuccessful outcome, outcome)	The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure.
>Procedure Criticality	O		ENUMERATED(reject, ignore, notify)	This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure). The value 'ignore' shall never be used.
Information Element Criticality Diagnostics		0 to <maxnoof errors>		
>IE Criticality	M		ENUMERATED(reject, ignore, notify)	The IE Criticality is used for reporting the criticality of the triggering IE. The value 'ignore' shall not be used.
>IE ID	M		INTEGER (0..65535)	The IE ID of the not understood or missing IE
>Repetition Number	O		INTEGER (1..256)	The repetition number of the not understood IE if applicable

Range bound	Explanation
maxnooferrors	Maximum no. of IE errors allowed to be reported with a single message. The value for maxnooferrors is 256.

9.2.1.36 Key Status

This IE tells if the keys included in SECURITY MODE COMMAND message are new or if the have been used previously.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Key Status	M		ENUMERATED (old, new, …)	

9.2.1.37 DRX Cycle Length Coefficient

This IE indicates the DRX cycle length coefficient (k) as defined in [10].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRX Cycle Length Coefficient	M		INTEGER (6...9)	

9.2.1.38 Iu Signalling Connection Identifier

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Iu Signalling Connection Identifier	M		BIT STRING (SIZE(24))	The most significant bit of this IE shall indicate the node, that has assigned the value. MSB = "0": assigned by the RNC MSB = "1": assigned by the CN

9.2.1.39 Global RNC-ID

Global RNC-ID is used to globally identify an RNC.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Global RNC-ID				
>PLMN-ID	M		OCTET STRING (SIZE (3))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -The PLMN-ID consists of 3 digits from MCC followed by either -a filler plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).
>RNC-ID	M		INTEGER (0..4095)	

9.2.1.40 PDP Type Information

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDP Type Information				
>PDP Type	M	1 to <maxnoofPDPDirections>	ENUMERATED(empty, PPP, OSP:IHOSS, IPv4, IPv6,…)	PDP Type is defined in [8], and the restrictions on usage shall comply with [8]. **Usage**: When the IE is repeated then PDP Type for downlink is signalled first, followed by PDP Type for uplink; when the IE is not repeated, the PDP Type shall apply to both uplink and downlink.

Range bound	Explanation
maxnoofPDPDirections	Number of directions for which PDP Type is signalled separately

9.2.1.41 Service Handover

This IE tells if intersystem handover to GSM should, should not, or shall not be performed for the RAB in question.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Service Handover	M		ENUMERATED (Handover to GSM should be performed, Handover to GSM should not be performed, Handover to GSM shall not be performed, …)	

9.2.2 Transport Network Layer Related IEs

9.2.2.1 Transport Layer Address

For the PS domain this information element is an IP address to be used for the user plane transport. For the CS domain this address is to be used for Transport Network Control Plane signalling to set up the transport bearer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transport Layer Address	M		BIT STRING (1..160, …)	The Radio Network layer is not supposed to interpret the address information. It should pass it to the transport layer for interpretation. For details on the Transport Layer Address, see ref. [9].

9.2.2.2 Iu Transport Association

This element is used to associate the RAB and the corresponding transport bearer. For the CS domain this information element is the Binding ID to be used in Transport Network Control Plane signalling during set up of the transport bearer. In PS domain this information element is the GTP Tunnel Endpoint Identifier.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Iu Transport Association**				
>GTP TEID	C – ifPS		OCTET STRING (4)	
>Binding ID	C - ifCS		OCTET STRING (4)	

Condition	Explanation
IfPS	This IE is only present for RABs towards the PS domain.
IfCS	This IE is only present for RABs towards the CS domain.

9.2.2.3 DL GTP-PDU Sequence Number

This IE indicates the sequence number of the GTP-PDU which is the next to be sent to the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DL GTP-PDU Sequence Number	M		INTEGER (0 ..65535)	This IE indicates the sequence number of the GTP-PDU which is next to be sent to the UE.

9.2.2.4 UL GTP-PDU Sequence Number

This IE indicates the sequence number of the GTP-PDU which is the next to be sent to the SGSN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UL GTP-PDU Sequence Number	M		INTEGER (0 ..65535)	This IE indicates the sequence number of the GTP-PDU which is next to be sent to the SGSN.

9.2.3 NAS Related IEs

9.2.3.1 Permanent NAS UE Identity

This element is used to identify the UE commonly in UTRAN and in CN. RNC uses it to find other existing signalling connections of this same UE (e.g. RRC or Iu signalling connections) Initially this is of the type of IMSI.

NOTE: IMSI is specified in the [19].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Permanent NAS UE Identity**				
>IMSI	M		OCTET STRING (SIZE (3..8))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -Number of decimal digits shall be from 6 to 15 starting with the digits from the PLMN-ID.

9.2.3.2 Temporary UE ID

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Temporary UE ID**				
>TMSI			OCTET STRING (4)	
>P-TMSI			OCTET STRING (4)	

9.2.3.3 Paging Cause

This element indicates the cause of paging to the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Paging Cause	M		ENUMERATED(Terminating Conversational Call, Terminating Streaming Call, Terminating Interactive Call, Terminating Background Call, SMS, ...)	

9.2.3.4 NAS Broadcast Information

Void

9.2.3.5 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, session management, supplementary services, short message service and mobility management messages.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
NAS PDU	M		OCTET STRING	

9.2.3.6 LAI

This element is used to uniquely identify a Location Area.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
LAI				
>PLMN-ID	M		OCTET STRING (SIZE (3))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -The PLMN-ID consists of 3 digits from MCC followed by either -a filler plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).
>LAC	M		OCTET STRING (2)	0000 and FFFE not allowed.

9.2.3.7 RAC

This element is used to identify a Routing Area within a Location Area. It is used for PS services.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAC	M		OCTET STRING (1)	

9.2.3.8 SAPI

The *SAPI* IE is used to indicate the specific service provided for the message.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SAPI	M		ENUMERATED (SAPI 0, SAPI 3, ...)	

9.2.3.9 SAI

Service Area Identifier (SAI) IE information (see ref. [3]) is used to identify an area consisting of one or more cells belonging to the same Location Area. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN. For this protocol, only a Service Area that is defined to be applicable to the PS and CS domains shall be used.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SAI				
>PLMN-ID	M		OCTET STRING (SIZE (3))	- digits 0 to 9, two digits per octet, - each digit encoded 0000 to 1001, - 1111 used as filler - bit 4 to 1 of octet n encoding digit 2n-1 - bit 8 to 5 of octet n encoding digit 2n -The PLMN-ID consists of 3 digits from MCC followed by either -a filler plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).
>LAC	M		OCTET STRING (2)	0000 and FFFE not allowed.
>SAC	M		OCTET STRING (2)	

9.2.3.10 Area Identity

This information element is used for indicating the location of a UE and is either a Service Area or Geographical Area.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Area Identity**				
>**SAI**			9.2.3.9	
>Geographical Area			9.2.3.11	

9.2.3.11 Geographical Area

Geographical Area IE is used to identify an area, as seen from the CN, using geographical coordinates. The reference system is the same as the one used in [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Geographical Area**				
>Point			See below	Ellipsoid point
>Point With Uncertainty			See below	Ellipsoid point with uncertainty circle
>Polygon			See below	List of Ellipsoid points

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Point				
>Geographical Coordinates	M		See below	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Point With Uncertainty				
>Geographical Coordinates	M		See below	
>Uncertainty Code	M		INTEGER(0...127)	The uncertainty "r" is derived from the "uncertainty code" k by $r = 10x(1.1^{k}-1)$

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Polygon				
>Geographical Coordinates	M	1 to <maxnoofPoints>	See below	

Range bound	Explanation
maxnoofPoints	Maximum no. of points in polygon. Value is 15.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Geographical Coordinates				
>Latitude Sign	M		ENUMERATED (North, South)	
>Degrees Of Latitude	M		INTEGER ($0...2^{23}-1$)	The IE value (N) is derived by this formula: $N \leq 2^{23} X /90 < N+1$ X being the latitude in degree (0°.. 90°)
>Degrees Of Longitude	M		INTEGER ($-2^{23}...2^{23}-1$)	The IE value (N) is derived by this formula: $N \leq 2^{24} X /360 < N+1$ X being the longitude in degree (-180°..+180°)

9.2.3.12 Unsuccessfully Transmitted Data Volume

This information element indicates the data volume (octets) that is unsuccessfully transmitted over the radio interface in DL direction for the RAB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Unsuccessfully Transmitted Data Volume	M		INTEGER (0.. 2^{32}-1)	Unit is octet.

9.2.3.13 Data Volume Reference

This information element indicates the time when the data volume is counted.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Data Volume Reference	M		INTEGER (0..255)	

9.2.3.14 Information Identity

Void

9.2.3.15 Information Priority

Void

9.2.3.16 Information Control

Void

9.2.3.17 CN Broadcast Area

Void

9.2.3.18 NAS Synchronisation Indicator

This information element contains transparent NAS information that is transferred without interpretation in the RNC.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
NAS Synchronisation Indicator	M		BIT STRING (4)	

9.3 Message and Information Element Abstract Syntax (with ASN.1)

9.3.0 General

RANAP ASN.1 definition conforms with [14] and [15].

The ASN.1 definition specifies the structure and content of RANAP messages. RANAP messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct a RANAP message according to the PDU definitions module and with the following additional rules (Note that in the following IE means an IE in the object set with an explicit id. If one IE needed to appear more than once in one object set, then the different occurrences have different IE ids):

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.

- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e. an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list where the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

If a RANAP message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in section 10.3.6.

Section 9.3 presents the Abstract Syntax of RANAP protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this section and the tabular format in sections 9.1 and 9.2, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, where the tabular format shall take precedence.

9.3.1 Usage of private message mechanism for non-standard use

The private message mechanism for non-standard use may be used:

- for special operator- (and/or vendor) specific features considered not to be part of the basic functionality, i.e. the functionality required for a complete and high-quality specification in order to guarantee multivendor interoperability;

- by vendors for research purposes, e.g. to implement and evaluate new algorithms/features before such features are proposed for standardisation.

The private message mechanism shall not be used for basic functionality. Such functionality shall be standardised.

9.3.2 Elementary Procedure Definitions

```
-- **************************************************************
--
-- Elementary Procedure definitions
--
-- **************************************************************

RANAP-PDU-Descriptions  {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-PDU-Descriptions (0)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    Criticality,
    ProcedureCode
FROM RANAP-CommonDataTypes

    Iu-ReleaseCommand,
    Iu-ReleaseComplete,
    RelocationCommand,
    RelocationPreparationFailure,
    RelocationRequired,
    RelocationRequest,
    RelocationRequestAcknowledge,
    RelocationFailure,
    RelocationCancel,
    RelocationCancelAcknowledge,
    SRNS-ContextRequest,
    SRNS-ContextResponse,
    SecurityModeCommand,
    SecurityModeComplete,
    SecurityModeReject,
    DataVolumeReportRequest,
    DataVolumeReport,
    Reset,
    ResetAcknowledge,
    RAB-ReleaseRequest,
    Iu-ReleaseRequest,
    RelocationDetect,
    RelocationComplete,
```

```
    Paging,
    CommonID,
    CN-InvokeTrace,
    CN-DeactivateTrace,
    LocationReportingControl,
    LocationReport,
    InitialUE-Message,
    DirectTransfer,
    Overload,
    ErrorIndication,
    SRNS-DataForwardCommand,
    ForwardSRNS-Context,
    RAB-AssignmentRequest,
    RAB-AssignmentResponse,
    PrivateMessage,
    ResetResource,
    ResetResourceAcknowledge,
    RANAP-RelocationInformation
FROM RANAP-PDU-Contents

    id-CN-DeactivateTrace,
    id-CN-InvokeTrace,
    id-CommonID,
    id-DataVolumeReport,
    id-DirectTransfer,
    id-ErrorIndication,
    id-ForwardSRNS-Context,
    id-InitialUE-Message,
    id-Iu-Release,
    id-Iu-ReleaseRequest,
    id-LocationReport,
    id-LocationReportingControl,
    id-OverloadControl,
    id-Paging,
    id-privateMessage,
    id-RAB-Assignment,
    id-RAB-ReleaseRequest,
    id-RANAP-Relocation,
    id-RelocationCancel,
    id-RelocationComplete,
    id-RelocationDetect,
    id-RelocationPreparation,
    id-RelocationResourceAllocation,
    id-Reset,
    id-SRNS-ContextTransfer,
    id-SRNS-DataForward,
    id-SecurityModeControl,
    id-ResetResource
FROM RANAP-Constants;

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

```
--
-- Interface Elementary Procedure Class
--
-- ***************************************************************

RANAP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage              ,
    &SuccessfulOutcome              OPTIONAL,
    &UnsuccessfulOutcome                OPTIONAL,
    &Outcome                    OPTIONAL,
    &procedureCode          ProcedureCode   UNIQUE,
    &criticality            Criticality     DEFAULT ignore
}
WITH SYNTAX {
    INITIATING MESSAGE      &InitiatingMessage
    [SUCCESSFUL OUTCOME     &SuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME       &UnsuccessfulOutcome]
    [OUTCOME            &Outcome]
    PROCEDURE CODE              &procedureCode
    [CRITICALITY            &criticality]
}

-- ***************************************************************
--
-- Interface PDU Definition
--
-- ***************************************************************

RANAP-PDU ::= CHOICE {
    initiatingMessage   InitiatingMessage,
    successfulOutcome   SuccessfulOutcome,
    unsuccessfulOutcome UnsuccessfulOutcome,
    outcome         Outcome,
    ...
}

InitiatingMessage ::= SEQUENCE {
    procedureCode   RANAP-ELEMENTARY-PROCEDURE.&procedureCode   ({RANAP-ELEMENTARY-PROCEDURES}),
    criticality RANAP-ELEMENTARY-PROCEDURE.&criticality     ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value       RANAP-ELEMENTARY-PROCEDURE.&InitiatingMessage   ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode   RANAP-ELEMENTARY-PROCEDURE.&procedureCode   ({RANAP-ELEMENTARY-PROCEDURES}),
    criticality RANAP-ELEMENTARY-PROCEDURE.&criticality     ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value       RANAP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome   ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode   RANAP-ELEMENTARY-PROCEDURE.&procedureCode   ({RANAP-ELEMENTARY-PROCEDURES}),
    criticality RANAP-ELEMENTARY-PROCEDURE.&criticality     ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
```

```
    value       RANAP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

Outcome ::= SEQUENCE {
    procedureCode   RANAP-ELEMENTARY-PROCEDURE.&procedureCode   ({RANAP-ELEMENTARY-PROCEDURES}),
    criticality RANAP-ELEMENTARY-PROCEDURE.&criticality     ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value       RANAP-ELEMENTARY-PROCEDURE.&Outcome     ({RANAP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

-- **************************************************************
--
-- Interface Elementary Procedure List
--
-- **************************************************************

RANAP-ELEMENTARY-PROCEDURES RANAP-ELEMENTARY-PROCEDURE ::= {
    RANAP-ELEMENTARY-PROCEDURES-CLASS-1 |
    RANAP-ELEMENTARY-PROCEDURES-CLASS-2 |
    RANAP-ELEMENTARY-PROCEDURES-CLASS-3 ,
    ...
}


RANAP-ELEMENTARY-PROCEDURES-CLASS-1 RANAP-ELEMENTARY-PROCEDURE ::= {
    iu-Release          |
    relocationPreparation       |
    relocationResourceAllocation    |
    relocationCancel        |
    sRNS-ContextTransfer        |
    securityModeControl     |
    dataVolumeReport        |
    reset       |
    resetResource               ,
    ...
}

RANAP-ELEMENTARY-PROCEDURES-CLASS-2 RANAP-ELEMENTARY-PROCEDURE ::= {
    rAB-ReleaseRequest      |
    iu-ReleaseRequest       |
    relocationDetect        |
    relocationComplete      |
    paging              |
    commonID            |
    cN-InvokeTrace          |
    cN-DeactivateTrace      |
    locationReportingControl    |
    locationReport          |
    initialUE-Message       |
    directTransfer          |
    overloadControl         |
    errorIndication         |
```

```
    sRNS-DataForward        |
    forwardSRNS-Context     |
    privateMessage      |
    rANAP-Relocation    ,
    ...
}

RANAP-ELEMENTARY-PROCEDURES-CLASS-3 RANAP-ELEMENTARY-PROCEDURE ::= {
    rAB-Assignment          ,
    ...
}

-- **************************************************************
--
-- Interface Elementary Procedures
--
-- **************************************************************

iu-Release RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  Iu-ReleaseCommand
    SUCCESSFUL OUTCOME  Iu-ReleaseComplete
    PROCEDURE CODE      id-Iu-Release
    CRITICALITY     ignore
}

relocationPreparation RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RelocationRequired
    SUCCESSFUL OUTCOME  RelocationCommand
    UNSUCCESSFUL OUTCOME    RelocationPreparationFailure
    PROCEDURE CODE          id-RelocationPreparation
    CRITICALITY     ignore
}

relocationResourceAllocation RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RelocationRequest
    SUCCESSFUL OUTCOME  RelocationRequestAcknowledge
    UNSUCCESSFUL OUTCOME    RelocationFailure
    PROCEDURE CODE          id-RelocationResourceAllocation
    CRITICALITY     ignore
}

relocationCancel RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RelocationCancel
    SUCCESSFUL OUTCOME  RelocationCancelAcknowledge
    PROCEDURE CODE      id-RelocationCancel
    CRITICALITY     ignore
}

sRNS-ContextTransfer RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SRNS-ContextRequest
    SUCCESSFUL OUTCOME  SRNS-ContextResponse
```

```
    PROCEDURE CODE      id-SRNS-ContextTransfer
    CRITICALITY     ignore
}

securityModeControl RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SecurityModeCommand
    SUCCESSFUL OUTCOME  SecurityModeComplete
    UNSUCCESSFUL OUTCOME    SecurityModeReject
    PROCEDURE CODE      id-SecurityModeControl
    CRITICALITY     ignore
}

dataVolumeReport RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  DataVolumeReportRequest
    SUCCESSFUL OUTCOME  DataVolumeReport
    PROCEDURE CODE      id-DataVolumeReport
    CRITICALITY     ignore
}


reset RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  Reset
    SUCCESSFUL OUTCOME  ResetAcknowledge
    PROCEDURE CODE      id-Reset
    CRITICALITY     ignore
}

rAB-ReleaseRequest RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RAB-ReleaseRequest
    PROCEDURE CODE      id-RAB-ReleaseRequest
    CRITICALITY     ignore
}

iu-ReleaseRequest RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  Iu-ReleaseRequest
    PROCEDURE CODE      id-Iu-ReleaseRequest
    CRITICALITY     ignore
}

relocationDetect RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RelocationDetect
    PROCEDURE CODE      id-RelocationDetect
    CRITICALITY     ignore
}

relocationComplete RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RelocationComplete
    PROCEDURE CODE      id-RelocationComplete
    CRITICALITY     ignore
}
```

```
paging RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  Paging
    PROCEDURE CODE      id-Paging
    CRITICALITY     ignore
}

commonID RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  CommonID
    PROCEDURE CODE      id-CommonID
    CRITICALITY     ignore
}

cN-InvokeTrace RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  CN-InvokeTrace
    PROCEDURE CODE      id-CN-InvokeTrace
    CRITICALITY     ignore
}

cN-DeactivateTrace RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  CN-DeactivateTrace
    PROCEDURE CODE          id-CN-DeactivateTrace
    CRITICALITY     ignore
}

locationReportingControl RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  LocationReportingControl
    PROCEDURE CODE      id-LocationReportingControl
    CRITICALITY     ignore
}

locationReport RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  LocationReport
    PROCEDURE CODE      id-LocationReport
    CRITICALITY     ignore
}

initialUE-Message RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  InitialUE-Message
    PROCEDURE CODE      id-InitialUE-Message
    CRITICALITY     ignore
}

directTransfer RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  DirectTransfer
    PROCEDURE CODE      id-DirectTransfer
    CRITICALITY     ignore
}

overloadControl RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  Overload
    PROCEDURE CODE      id-OverloadControl
```

```
    CRITICALITY     ignore
}

errorIndication RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  ErrorIndication
    PROCEDURE CODE      id-ErrorIndication
    CRITICALITY     ignore
}

sRNS-DataForward RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SRNS-DataForwardCommand
    PROCEDURE CODE      id-SRNS-DataForward
    CRITICALITY     ignore
}

forwardSRNS-Context RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  ForwardSRNS-Context
    PROCEDURE CODE      id-ForwardSRNS-Context
    CRITICALITY     ignore
}

rAB-Assignment RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RAB-AssignmentRequest
    OUTCOME         RAB-AssignmentResponse
    PROCEDURE CODE      id-RAB-Assignment
    CRITICALITY     ignore
}

privateMessage RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  PrivateMessage

    PROCEDURE CODE  id-privateMessage
    CRITICALITY     ignore
}

resetResource RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  ResetResource
    SUCCESSFUL OUTCOME  ResetResourceAcknowledge
    PROCEDURE CODE          id-ResetResource
    CRITICALITY     ignore
}

rANAP-Relocation RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RANAP-RelocationInformation
    PROCEDURE CODE          id-RANAP-Relocation
    CRITICALITY     ignore
}

END
```

9.3.3 PDU Definitions

```
-- **************************************************************
--
-- PDU definitions for RANAP.
--
-- **************************************************************

RANAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    DataVolumeReference,
    AreaIdentity,
    CN-DomainIndicator,
    Cause,
    CriticalityDiagnostics,
    ChosenEncryptionAlgorithm,
    ChosenIntegrityProtectionAlgorithm,
    ClassmarkInformation2,
    ClassmarkInformation3,
    DL-GTP-PDU-SequenceNumber,
    DL-N-PDU-SequenceNumber,
    DataVolumeReportingIndication,
    DRX-CycleLengthCoefficient,
    EncryptionInformation,
    GlobalRNC-ID,
    IntegrityProtectionInformation,
    IuSignallingConnectionIdentifier,
    IuTransportAssociation,
    KeyStatus,
    L3-Information,
    LAI,
    NAS-PDU,
    NAS-SynchronisationIndicator,
    NonSearchingIndication,
    NumberOfSteps,
    OMC-ID,
    OldBSS-ToNewBSS-Information,
```

```
    PagingAreaID,
    PagingCause,
    PDP-TypeInformation,
    PermanentNAS-UE-ID,
    RAB-ID,
    RAB-Parameters,
    RAC,
    RelocationType,
    RequestType,
    SAI,
    SAPI,
    Service-Handover,
    SourceID,
    SourceRNC-ToTargetRNC-TransparentContainer,
    TargetID,
    TargetRNC-ToSourceRNC-TransparentContainer,
    TemporaryUE-ID,
    TraceReference,
    TraceType,
    UnsuccessfullyTransmittedDataVolume,
    TransportLayerAddress,
    TriggerID,
    UE-ID,
    UL-GTP-PDU-SequenceNumber,
    UL-N-PDU-SequenceNumber,
    UP-ModeVersions,
    UserPlaneMode
FROM RANAP-IEs


    PrivateIE-Container{},
    ProtocolExtensionContainer{},
    ProtocolIE-ContainerList{},
    ProtocolIE-ContainerPair{},
    ProtocolIE-ContainerPairList{},
    ProtocolIE-Container{},
    RANAP-PRIVATE-IES,
    RANAP-PROTOCOL-EXTENSION,
    RANAP-PROTOCOL-IES,
    RANAP-PROTOCOL-IES-PAIR
FROM RANAP-Containers

    maxNrOfDTs,
    maxNrOfErrors,
    maxNrOfIuSigConIds,
    maxNrOfRABs,
    maxNrOfVol,

    id-AreaIdentity,
    id-CN-DomainIndicator,
    id-Cause,
```

```
    id-ChosenEncryptionAlgorithm,
    id-ChosenIntegrityProtectionAlgorithm,
    id-ClassmarkInformation2,
    id-ClassmarkInformation3,
    id-CriticalityDiagnostics,
    id-DRX-CycleLengthCoefficient,
    id-DirectTransferInformationItem-RANAP-RelocInf,
    id-DirectTransferInformationList-RANAP-RelocInf,
    id-DL-GTP-PDU-SequenceNumber,
    id-EncryptionInformation,
    id-GlobalRNC-ID,
    id-IntegrityProtectionInformation,
    id-IuSigConId,
    id-IuSigConIdItem,
    id-IuSigConIdList,
    id-IuTransportAssociation,
    id-KeyStatus,
    id-L3-Information,
    id-LAI,
    id-NAS-PDU,
    id-NonSearchingIndication,
    id-NumberOfSteps,
    id-OMC-ID,
    id-OldBSS-ToNewBSS-Information,
    id-PagingAreaID,
    id-PagingCause,
    id-PermanentNAS-UE-ID,
    id-RAB-ContextItem,
    id-RAB-ContextList,
    id-RAB-ContextFailedtoTransferItem,
    id-RAB-ContextFailedtoTransferList,
    id-RAB-ContextItem-RANAP-RelocInf,
    id-RAB-ContextList-RANAP-RelocInf,
    id-RAB-DataForwardingItem,
    id-RAB-DataForwardingItem-SRNS-CtxReq,
    id-RAB-DataForwardingList,
    id-RAB-DataForwardingList-SRNS-CtxReq,
    id-RAB-DataVolumeReportItem,
    id-RAB-DataVolumeReportList,
    id-RAB-DataVolumeReportRequestItem,
    id-RAB-DataVolumeReportRequestList,
    id-RAB-FailedItem,
    id-RAB-FailedList,
    id-RAB-FailedtoReportItem,
    id-RAB-FailedtoReportList,
    id-RAB-ID,
    id-RAB-QueuedItem,
    id-RAB-QueuedList,
    id-RAB-ReleaseFailedList,
    id-RAB-ReleaseItem,
    id-RAB-ReleasedItem-IuRelComp,
```

```
    id-RAB-ReleaseList,
    id-RAB-ReleasedItem,
    id-RAB-ReleasedList,
    id-RAB-ReleasedList-IuRelComp,
    id-RAB-RelocationReleaseItem,
    id-RAB-RelocationReleaseList,
    id-RAB-SetupItem-RelocReq,
    id-RAB-SetupItem-RelocReqAck,
    id-RAB-SetupList-RelocReq,
    id-RAB-SetupList-RelocReqAck,
    id-RAB-SetupOrModifiedItem,
    id-RAB-SetupOrModifiedList,
    id-RAB-SetupOrModifyItem,
    id-RAB-SetupOrModifyList,
    id-RAC,
    id-RelocationType,
    id-RequestType,
    id-SAI,
    id-SAPI,
    id-SourceID,
    id-SourceRNC-ToTargetRNC-TransparentContainer,
    id-TargetID,
    id-TargetRNC-ToSourceRNC-TransparentContainer,
    id-TemporaryUE-ID,
    id-TraceReference,
    id-TraceType,
    id-TransportLayerAddress,
    id-TriggerID,
    id-UE-ID,
    id-UL-GTP-PDU-SequenceNumber
FROM RANAP-Constants;

-- **************************************************************
--
-- Common Container Lists
--
-- **************************************************************

RAB-IE-ContainerList                { RANAP-PROTOCOL-IES      : IEsSetParam } ::= ProtocolIE-ContainerList     { 1, maxNrOfRABs,   {IEsSetParam} }
RAB-IE-ContainerPairList            { RANAP-PROTOCOL-IES-PAIR : IEsSetParam } ::= ProtocolIE-ContainerPairList { 1, maxNrOfRABs,   {IEsSetParam} }
ProtocolError-IE-ContainerList      { RANAP-PROTOCOL-IES      : IEsSetParam } ::= ProtocolIE-ContainerList     { 1, maxNrOfRABs,   {IEsSetParam} }
IuSigConId-IE-ContainerList         { RANAP-PROTOCOL-IES      : IEsSetParam } ::= ProtocolIE-ContainerList     { 1, maxNrOfIuSigConIds,
{IEsSetParam} }
DirectTransfer-IE-ContainerList   { RANAP-PROTOCOL-IES      : IEsSetParam } ::= ProtocolIE-ContainerList     { 1, maxNrOfDTs,    {IEsSetParam} }

-- **************************************************************
--
-- Iu RELEASE ELEMENTARY PROCEDURE
--
-- **************************************************************
```

```
-- **************************************************************
--
-- Iu Release Command
--
-- **************************************************************

Iu-ReleaseCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {Iu-ReleaseCommandIEs} },
    protocolExtensions      ProtocolExtensionContainer { {Iu-ReleaseCommandExtensions} }            OPTIONAL,
    ...
}

Iu-ReleaseCommandIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  },
    ...
}

Iu-ReleaseCommandExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Iu Release Complete
--
-- **************************************************************

Iu-ReleaseComplete ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {Iu-ReleaseCompleteIEs} },
    protocolExtensions      ProtocolExtensionContainer { {Iu-ReleaseCompleteExtensions} }           OPTIONAL,
    ...
}

Iu-ReleaseCompleteIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataVolumeReportList        CRITICALITY ignore  TYPE RAB-DataVolumeReportList       PRESENCE conditional
    -- This group is only present if data volume reporting for PS domain is required --                    } |
    { ID id-RAB-ReleasedList-IuRelComp      CRITICALITY ignore  TYPE RAB-ReleasedList-IuRelComp     PRESENCE conditional
    -- This group is only present for RABs towards the PS domain when sequence numbers are available and when the release was initiated by UTRAN --
                } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional   },
    ...
}

RAB-DataVolumeReportList                ::= RAB-IE-ContainerList { {RAB-DataVolumeReportItemIEs} }

RAB-DataVolumeReportItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataVolumeReportItem        CRITICALITY ignore  TYPE RAB-DataVolumeReportItem       PRESENCE mandatory  },
    ...
}

RAB-DataVolumeReportItem ::= SEQUENCE {
```

```
    rAB-ID                      RAB-ID,
    dl-UnsuccessfullyTransmittedDataVolume      DataVolumeList      OPTIONAL
    -- This IE is only present if data volume reporting for PS domain is required --,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-DataVolumeReportItem-ExtIEs} }      OPTIONAL,
    ...
}

RAB-DataVolumeReportItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ReleasedList-IuRelComp              ::= RAB-IE-ContainerList { {RAB-ReleasedItem-IuRelComp-IEs} }

RAB-ReleasedItem-IuRelComp-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ReleasedItem-IuRelComp          CRITICALITY ignore  TYPE RAB-ReleasedItem-IuRelComp          PRESENCE mandatory   },
    ...
}

RAB-ReleasedItem-IuRelComp  ::= SEQUENCE {
        rAB-ID                      RAB-ID,
        dL-GTP-PDU-SequenceNumber   DL-GTP-PDU-SequenceNumber   OPTIONAL
        --This IE is only present when available--,
        uL-GTP-PDU-SequenceNumber   UL-GTP-PDU-SequenceNumber   OPTIONAL
        --This IE is only present when available--,
        iE-Extensions               ProtocolExtensionContainer { {RAB-ReleasedItem-IuRelComp-ExtIEs} }       OPTIONAL,
    ...
}

RAB-ReleasedItem-IuRelComp-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}


Iu-ReleaseCompleteExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RELOCATION PREPARATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Relocation Required
--
-- **************************************************************

RelocationRequired ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationRequiredIEs} },
```

```
    protocolExtensions      ProtocolExtensionContainer { {RelocationRequiredExtensions} }           OPTIONAL,
        ...
}

RelocationRequiredIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RelocationType              CRITICALITY ignore  TYPE RelocationType                PRESENCE mandatory } |
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory } |
    { ID id-SourceID                CRITICALITY ignore  TYPE SourceID                   PRESENCE mandatory} |
    { ID id-TargetID                CRITICALITY reject  TYPE TargetID                   PRESENCE mandatory} |
    { ID id-ClassmarkInformation2           CRITICALITY ignore  TYPE ClassmarkInformation2       PRESENCE conditional
    -- This is only present when initiating an inter system handover towards GSM BSC --                    } |
    { ID id-ClassmarkInformation3           CRITICALITY ignore  TYPE ClassmarkInformation3       PRESENCE conditional
    -- This is only present when initiating an inter system handover towards GSM BSC --                    } |
    { ID id-SourceRNC-ToTargetRNC-TransparentContainer
                            CRITICALITY reject  TYPE SourceRNC-ToTargetRNC-TransparentContainer PRESENCE conditional
    -- This IE shall be present when initiating relocation of SRNS  --                                     } |
    { ID id-OldBSS-ToNewBSS-Information     CRITICALITY ignore  TYPE OldBSS-ToNewBSS-Information    PRESENCE conditional
    -- This is only present when initiating an inter system handover towards GSM BSC --                    } ,
    ...
}

RelocationRequiredExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Relocation Command
--
-- **************************************************************

RelocationCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationCommandIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationCommandExtensions} }            OPTIONAL,
    ...
}

RelocationCommandIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TargetRNC-ToSourceRNC-TransparentContainer
                            CRITICALITY reject  TYPE TargetRNC-ToSourceRNC-TransparentContainer PRESENCE conditional
    -- This IE shall be included if it is received by the CN from the relocation target. --                } |
    { ID id-L3-Information              CRITICALITY ignore  TYPE L3-Information             PRESENCE conditional
    -- This IE shall be included if it is received by the CN from the relocation target. --                } |
    { ID id-RAB-RelocationReleaseList       CRITICALITY ignore  TYPE RAB-RelocationReleaseList      PRESENCE optional } |
    { ID id-RAB-DataForwardingList          CRITICALITY ignore  TYPE RAB-DataForwardingList      PRESENCE conditional
    -- This group if applicable is only present for RABs towards the PS domain --                          } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

RAB-RelocationReleaseList               ::= RAB-IE-ContainerList { {RAB-RelocationReleaseItemIEs} }
```

```
RAB-RelocationReleaseItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-RelocationReleaseItem       CRITICALITY ignore  TYPE RAB-RelocationReleaseItem      PRESENCE mandatory   },
    ...
}

RAB-RelocationReleaseItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-RelocationReleaseItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-RelocationReleaseItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-DataForwardingList                  ::= RAB-IE-ContainerList { {RAB-DataForwardingItemIEs} }

RAB-DataForwardingItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataForwardingItem          CRITICALITY ignore  TYPE RAB-DataForwardingItem      PRESENCE mandatory   },
    ...
}

RAB-DataForwardingItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    transportLayerAddress               TransportLayerAddress,
    iuTransportAssociation              IuTransportAssociation,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-DataForwardingItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-DataForwardingItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RelocationCommandExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Relocation Preparation Failure
--
-- **************************************************************

RelocationPreparationFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationPreparationFailureIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationPreparationFailureExtensions} }       OPTIONAL,
        ...
}
```

```
RelocationPreparationFailureIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

RelocationPreparationFailureExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RELOCATION RESOURCE ALLOCATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Relocation Request
--
-- **************************************************************

RelocationRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationRequestExtensions} }            OPTIONAL,
    ...
}

RelocationRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-PermanentNAS-UE-ID          CRITICALITY ignore  TYPE PermanentNAS-UE-ID             PRESENCE conditional
    -- This IE is only present if available at the sending side --                                  } |
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  } |
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator             PRESENCE mandatory  } |
    { ID id-SourceRNC-ToTargetRNC-TransparentContainer
                            CRITICALITY reject  TYPE SourceRNC-ToTargetRNC-TransparentContainer PRESENCE mandatory  } |
    { ID id-RAB-SetupList-RelocReq          CRITICALITY reject  TYPE RAB-SetupList-RelocReq      PRESENCE optional } |
    { ID id-IntegrityProtectionInformation      CRITICALITY ignore  TYPE IntegrityProtectionInformation      PRESENCE conditional
    -- This IE is only present if available at the sending side --                                  } |
    { ID id-EncryptionInformation           CRITICALITY ignore  TYPE EncryptionInformation       PRESENCE optional } |
    { ID id-IuSigConId  CRITICALITY ignore TYPE IuSignallingConnectionIdentifier  PRESENCE mandatory },
    ...
}

RAB-SetupList-RelocReq                  ::= RAB-IE-ContainerList { {RAB-SetupItem-RelocReq-IEs} }

RAB-SetupItem-RelocReq-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupItem-RelocReq          CRITICALITY reject  TYPE RAB-SetupItem-RelocReq      PRESENCE mandatory   },
    ...
}

RAB-SetupItem-RelocReq ::= SEQUENCE {
```

```
    rAB-ID                      RAB-ID,
    nAS-SynchronisationIndicator    NAS-SynchronisationIndicator    OPTIONAL
    -- This IE is present if the relevant NAS information is provided by the CN --,
    rAB-Parameters                  RAB-Parameters,
    dataVolumeReportingIndication          DataVolumeReportingIndication   OPTIONAL
    -- This IE, if applicable, is only present for RABs towards the PS domain --,
    pDP-TypeInformation             PDP-TypeInformation     OPTIONAL
    -- This IE is only present for RABs towards the PS domain --,
    userPlaneInformation                UserPlaneInformation,
    transportLayerAddress               TransportLayerAddress,
    iuTransportAssociation              IuTransportAssociation,
    service-Handover                Service-Handover        OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-SetupItem-RelocReq-ExtIEs} }        OPTIONAL,
    ...
}

RAB-SetupItem-RelocReq-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

UserPlaneInformation ::= SEQUENCE {
    userPlaneMode                   UserPlaneMode,
    uP-ModeVersions                 UP-ModeVersions,
    iE-Extensions                   ProtocolExtensionContainer { {UserPlaneInformation-ExtIEs} }       OPTIONAL,
    ...
}

UserPlaneInformation-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RelocationRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Relocation Request Acknowledge
--
-- **************************************************************

RelocationRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationRequestAcknowledgeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationRequestAcknowledgeExtensions} }       OPTIONAL,
    ...
}

RelocationRequestAcknowledgeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TargetRNC-ToSourceRNC-TransparentContainer
                        CRITICALITY ignore  TYPE TargetRNC-ToSourceRNC-TransparentContainer PRESENCE conditional
    -- Must be included if applicapble and if not sent via the other CN --                              } |
```

```
    { ID id-RAB-SetupList-RelocReqAck       CRITICALITY ignore  TYPE RAB-SetupList-RelocReqAck      PRESENCE optional} |
    { ID id-RAB-FailedList              CRITICALITY ignore  TYPE RAB-FailedList             PRESENCE optional }|
    { ID id-ChosenIntegrityProtectionAlgorithm  CRITICALITY ignore  TYPE ChosenIntegrityProtectionAlgorithm     PRESENCE conditional
    -- This IE is only present if available at the sending side --                                  } |
    { ID id-ChosenEncryptionAlgorithm       CRITICALITY ignore  TYPE ChosenEncryptionAlgorithm      PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

RAB-SetupList-RelocReqAck               ::= RAB-IE-ContainerList { {RAB-SetupItem-RelocReqAck-IEs} }

RAB-SetupItem-RelocReqAck-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupItem-RelocReqAck       CRITICALITY reject  TYPE RAB-SetupItem-RelocReqAck      PRESENCE mandatory   },
    ...
}

RAB-SetupItem-RelocReqAck ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    transportLayerAddress               TransportLayerAddress   OPTIONAL,
    --This IE is only present for RABS towards the PS Domain
    iuTransportAssociation              IuTransportAssociation  OPTIONAL,
    --This IE is only present for RABS towards the PS Domain
    iE-Extensions                   ProtocolExtensionContainer { {RAB-SetupItem-RelocReqAck-ExtIEs} }        OPTIONAL,
    ...
}

RAB-SetupItem-RelocReqAck-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-FailedList                      ::= RAB-IE-ContainerList { {RAB-FailedItemIEs} }

RAB-FailedItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-FailedItem              CRITICALITY ignore  TYPE RAB-FailedItem             PRESENCE mandatory   },
    ...
}

RAB-FailedItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    cause                       Cause,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-FailedItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-FailedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RelocationRequestAcknowledgeExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
-- **************************************************************
--
-- Relocation Failure
--
-- **************************************************************

RelocationFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationFailureIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationFailureExtensions} }            OPTIONAL,
    ...
}

RelocationFailureIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

RelocationFailureExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RELOCATION CANCEL ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Relocation Cancel
--
-- **************************************************************

RelocationCancel ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationCancelIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationCancelExtensions} }          OPTIONAL,
    ...
}

RelocationCancelIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  },
    ...
}

RelocationCancelExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

```
--
-- Relocation Cancel Acknowledge
--
-- **************************************************************

RelocationCancelAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationCancelAcknowledgeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationCancelAcknowledgeExtensions} }        OPTIONAL,
    ...
}

RelocationCancelAcknowledgeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional },
    ...
}

RelocationCancelAcknowledgeExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- SRNS CONTEXT TRANSFER OPEARATION
--
-- **************************************************************

-- **************************************************************
--
-- SRNS Context Request
--
-- **************************************************************

SRNS-ContextRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SRNS-ContextRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SRNS-ContextRequestExtensions} }          OPTIONAL,
    ...
}

SRNS-ContextRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataForwardingList-SRNS-CtxReq  CRITICALITY ignore  TYPE RAB-DataForwardingList-SRNS-CtxReq     PRESENCE mandatory   },
    ...
}

RAB-DataForwardingList-SRNS-CtxReq          ::= RAB-IE-ContainerList { {RAB-DataForwardingItem-SRNS-CtxReq-IEs} }

RAB-DataForwardingItem-SRNS-CtxReq-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataForwardingItem-SRNS-CtxReq  CRITICALITY ignore  TYPE RAB-DataForwardingItem-SRNS-CtxReq     PRESENCE mandatory   },
    ...
}

RAB-DataForwardingItem-SRNS-CtxReq ::= SEQUENCE {
```

```
    rAB-ID                      RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-DataForwardingItem-SRNS-CtxReq-ExtIEs} }        OPTIONAL,
    ...
}

RAB-DataForwardingItem-SRNS-CtxReq-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SRNS-ContextRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- SRNS Context Response
--
-- **************************************************************

SRNS-ContextResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SRNS-ContextResponseIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SRNS-ContextResponseExtensions} }         OPTIONAL,
    ...
}

SRNS-ContextResponseIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ContextList             CRITICALITY ignore  TYPE RAB-ContextList                PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --  } |
    { ID id-RAB-ContextFailedtoTransferList     CRITICALITY ignore  TYPE RAB-ContextFailedtoTransferList     PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --  }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional },
    ...
}

RAB-ContextList                     ::= RAB-IE-ContainerList { {RAB-ContextItemIEs} }

RAB-ContextItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ContextItem             CRITICALITY ignore  TYPE RAB-ContextItem                PRESENCE mandatory },
    ...
}

RAB-ContextItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    dl-GTP-PDU-SequenceNumber           DL-GTP-PDU-SequenceNumber   OPTIONAL
    --This IE is only present when available--,
    ul-GTP-PDU-SequenceNumber           UL-GTP-PDU-SequenceNumber   OPTIONAL
    --This IE is only present when available--,
    dl-N-PDU-SequenceNumber             DL-N-PDU-SequenceNumber     OPTIONAL
    --This IE is only present when available--,
    ul-N-PDU-SequenceNumber             UL-N-PDU-SequenceNumber     OPTIONAL
    --This IE is only present when available--,
```

```
    iE-Extensions                   ProtocolExtensionContainer { {RAB-ContextItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-ContextItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ContextFailedtoTransferList                 ::= RAB-IE-ContainerList { {RABs-ContextFailedtoTransferItemIEs} }

RABs-ContextFailedtoTransferItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ContextFailedtoTransferItem     CRITICALITY ignore  TYPE RABs-ContextFailedtoTransferItem       PRESENCE mandatory   },
    ...
}

RABs-ContextFailedtoTransferItem::= SEQUENCE {
    rAB-ID                      RAB-ID,
    cause                       Cause,
    iE-Extensions                   ProtocolExtensionContainer { { RABs-ContextFailedtoTransferItem-ExtIEs} }      OPTIONAL,
    ...
}


RABs-ContextFailedtoTransferItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SRNS-ContextResponseExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- SECURITY MODE CONTROL ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Security Mode Command
--
-- **************************************************************

SecurityModeCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SecurityModeCommandIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SecurityModeCommandExtensions} }          OPTIONAL,
    ...
}

SecurityModeCommandIEs RANAP-PROTOCOL-IES ::= {
    { ID id-IntegrityProtectionInformation      CRITICALITY ignore  TYPE IntegrityProtectionInformation    PRESENCE mandatory   } |
```

```
    { ID id-EncryptionInformation          CRITICALITY ignore  TYPE EncryptionInformation       PRESENCE optional } |
    { ID id-KeyStatus                      CRITICALITY ignore  TYPE KeyStatus                   PRESENCE mandatory},
    ...
}

SecurityModeCommandExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Security Mode Complete
--
-- **************************************************************

SecurityModeComplete ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SecurityModeCompleteIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SecurityModeCompleteExtensions} }         OPTIONAL,
    ...
}

SecurityModeCompleteIEs RANAP-PROTOCOL-IES ::= {
    { ID id-ChosenIntegrityProtectionAlgorithm  CRITICALITY ignore  TYPE ChosenIntegrityProtectionAlgorithm  PRESENCE mandatory  } |
    { ID id-ChosenEncryptionAlgorithm       CRITICALITY ignore  TYPE ChosenEncryptionAlgorithm       PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE optional },
    ...
}

SecurityModeCompleteExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Security Mode Reject
--
-- **************************************************************

SecurityModeReject ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SecurityModeRejectIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SecurityModeRejectExtensions} }           OPTIONAL,
    ...
}

SecurityModeRejectIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional },
    ...
}

SecurityModeRejectExtensions RANAP-PROTOCOL-EXTENSION ::= {
```

```
    ...
}

-- **************************************************************
--
-- DATA VOLUME REPORT ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Data Volume Report Request
--
-- **************************************************************

DataVolumeReportRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {DataVolumeReportRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {DataVolumeReportRequestExtensions} }      OPTIONAL,
    ...
}

DataVolumeReportRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataVolumeReportRequestList     CRITICALITY ignore  TYPE RAB-DataVolumeReportRequestList     PRESENCE mandatory   },
    ...
}

RAB-DataVolumeReportRequestList             ::= RAB-IE-ContainerList { {RAB-DataVolumeReportRequestItemIEs} }

RAB-DataVolumeReportRequestItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataVolumeReportRequestItem     CRITICALITY ignore  TYPE RAB-DataVolumeReportRequestItem     PRESENCE mandatory   },
    ...
}

RAB-DataVolumeReportRequestItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-DataVolumeReportRequestItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-DataVolumeReportRequestItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

DataVolumeReportRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Data Volume Report
--
```

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

DataVolumeReport ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {DataVolumeReportIEs} },
    protocolExtensions      ProtocolExtensionContainer { {DataVolumeReportExtensions} }          OPTIONAL,
    ...
}

DataVolumeReportIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataVolumeReportList        CRITICALITY ignore  TYPE RAB-DataVolumeReportList       PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --  } |
    { ID id-RAB-FailedtoReportList          CRITICALITY ignore  TYPE RAB-FailedtoReportList       PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --  } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional },
    ...
}

DataVolumeReportExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-FailedtoReportList              ::= RAB-IE-ContainerList { {RABs-failed-to-reportItemIEs} }

RABs-failed-to-reportItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-FailedtoReportItem      CRITICALITY ignore  TYPE RABs-failed-to-reportItem       PRESENCE mandatory   },
    ...
}

RABs-failed-to-reportItem::= SEQUENCE {
    rAB-ID                      RAB-ID,
    cause                       Cause,
    iE-Extensions                   ProtocolExtensionContainer { { RABs-failed-to-reportItem-ExtIEs} }       OPTIONAL,
    ...
}


RABs-failed-to-reportItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- **************************************************************
--
-- RESET ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Reset
--
```

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

Reset ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ResetExtensions} }                    OPTIONAL,
    ...
}

ResetIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory  } |
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator             PRESENCE mandatory  } |
    { ID id-GlobalRNC-ID                CRITICALITY ignore  TYPE GlobalRNC-ID               PRESENCE conditional
    -- This IE is always used in the uplink direction --                                            },
    ...
}

ResetExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Reset Acknowledge
--
-- **************************************************************

ResetAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetAcknowledgeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ResetAcknowledgeExtensions} }          OPTIONAL,
    ...
}

ResetAcknowledgeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator             PRESENCE mandatory  } |
     { ID id-CriticalityDiagnostics         CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE optional } |
    { ID id-GlobalRNC-ID                CRITICALITY ignore  TYPE GlobalRNC-ID               PRESENCE conditional
    -- This IE is always used in the uplink direction --                                            },
    ...
}

ResetAcknowledgeExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
-- **************************************************************
--
-- RESET RESOURCE ELEMENTARY PROCEDURE
--
-- **************************************************************


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

```
--
-- Reset Resource
--
-- **************************************************************

ResetResource ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetResourceIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ResetResourceExtensions} }                OPTIONAL,
    ...
}

ResetResourceIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator             PRESENCE mandatory } |
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                   PRESENCE mandatory } |
    { ID id-IuSigConIdList              CRITICALITY ignore  TYPE ResetResourceList              PRESENCE mandatory } |
    { ID id-GlobalRNC-ID                CRITICALITY ignore  TYPE GlobalRNC-ID               PRESENCE conditional
    -- This IE is always used in the uplink direction --                                            },
    ...
}

ResetResourceList   ::= IuSigConId-IE-ContainerList{ {ResetResourceItemIEs} }

ResetResourceItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-IuSigConIdItem              CRITICALITY ignore  TYPE    ResetResourceItem           PRESENCE mandatory },
    ...
}

ResetResourceItem ::= SEQUENCE {
    iuSigConId                  IuSignallingConnectionIdentifier,
    iE-Extensions               ProtocolExtensionContainer { { ResetResourceItem-ExtIEs} }       OPTIONAL,
    ...
}

ResetResourceItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetResourceExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Reset Resource Acknowledge
--
-- **************************************************************

ResetResourceAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetResourceAcknowledgeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ResetResourceAcknowledgeExtensions} }        OPTIONAL,
    ...
```

```
}

ResetResourceAcknowledgeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator            PRESENCE mandatory } |
    { ID id-IuSigConIdList              CRITICALITY ignore  TYPE ResetResourceAckList          PRESENCE mandatory } |
    { ID id-GlobalRNC-ID                CRITICALITY ignore  TYPE GlobalRNC-ID               PRESENCE conditional
     -- This IE is always used in the uplink direction --                                          } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE optional },
    ...
}
ResetResourceAckList    ::= IuSigConId-IE-ContainerList{ {ResetResourceAckItemIEs} }

ResetResourceAckItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-IuSigConIdItem              CRITICALITY ignore  TYPE    ResetResourceAckItem         PRESENCE mandatory   },
    ...
}

ResetResourceAckItem ::= SEQUENCE {
    iuSigConId                  IuSignallingConnectionIdentifier,
    iE-Extensions               ProtocolExtensionContainer { { ResetResourceAckItem-ExtIEs} }       OPTIONAL,
    ...
}

ResetResourceAckItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetResourceAcknowledgeExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RAB RELEASE REQUEST ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- RAB Release Request
--
-- **************************************************************

RAB-ReleaseRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RAB-ReleaseRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RAB-ReleaseRequestExtensions} }           OPTIONAL,
    ...
}

RAB-ReleaseRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ReleaseList             CRITICALITY ignore  TYPE RAB-ReleaseList               PRESENCE mandatory },
```

```
    ...
}

RAB-ReleaseList                     ::= RAB-IE-ContainerList { {RAB-ReleaseItemIEs} }

RAB-ReleaseItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ReleaseItem             CRITICALITY ignore  TYPE RAB-ReleaseItem                PRESENCE mandatory },
    ...
}

RAB-ReleaseItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    cause                       Cause,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-ReleaseItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-ReleaseItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ReleaseRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- Iu RELEASE REQUEST ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Iu Release Request
--
-- **************************************************************

Iu-ReleaseRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {Iu-ReleaseRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {Iu-ReleaseRequestExtensions} }            OPTIONAL,
    ...
}

Iu-ReleaseRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE mandatory },
    ...
}

Iu-ReleaseRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
-- **************************************************************
--
-- RELOCATION DETECT ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Relocation Detect
--
-- **************************************************************

RelocationDetect ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationDetectIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationDetectExtensions} }          OPTIONAL,
    ...
}

RelocationDetectIEs RANAP-PROTOCOL-IES ::= {
    ...
}

RelocationDetectExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RELOCATION COMPLETE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Relocation Complete
--
-- **************************************************************

RelocationComplete ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RelocationCompleteIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RelocationCompleteExtensions} }           OPTIONAL,
    ...
}

RelocationCompleteIEs RANAP-PROTOCOL-IES ::= {
    ...
}

RelocationCompleteExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}

-- **************************************************************
--
-- PAGING ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Paging
--
-- **************************************************************

Paging ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {PagingIEs} },
    protocolExtensions      ProtocolExtensionContainer { {PagingExtensions} }                   OPTIONAL,
    ...
}

PagingIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator             PRESENCE mandatory } |
    { ID id-PermanentNAS-UE-ID          CRITICALITY ignore  TYPE PermanentNAS-UE-ID             PRESENCE mandatory } |
    { ID id-TemporaryUE-ID              CRITICALITY ignore  TYPE TemporaryUE-ID             PRESENCE optional } |
    { ID id-PagingAreaID                CRITICALITY ignore  TYPE PagingAreaID               PRESENCE optional } |
    { ID id-PagingCause             CRITICALITY ignore  TYPE PagingCause                PRESENCE optional } |
    { ID id-NonSearchingIndication          CRITICALITY ignore  TYPE NonSearchingIndication       PRESENCE optional } |
    { ID id-DRX-CycleLengthCoefficient              CRITICALITY ignore  TYPE DRX-CycleLengthCoefficient          PRESENCE optional } ,
    ...
}

PagingExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- COMMON ID ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Common ID
--
-- **************************************************************

CommonID ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {CommonID-IEs} },
    protocolExtensions      ProtocolExtensionContainer { {CommonIDExtensions} }                 OPTIONAL,
    ...
```

```
}

CommonID-IEs RANAP-PROTOCOL-IES ::= {
    { ID id-PermanentNAS-UE-ID          CRITICALITY ignore  TYPE PermanentNAS-UE-ID            PRESENCE mandatory },
    ...
}

CommonIDExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- CN INVOKE TRACE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- CN Invoke Trace
--
-- **************************************************************

CN-InvokeTrace ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {CN-InvokeTraceIEs} },
    protocolExtensions      ProtocolExtensionContainer { {CN-InvokeTraceExtensions} }            OPTIONAL,
    ...
}

CN-InvokeTraceIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TraceType               CRITICALITY ignore  TYPE TraceType                 PRESENCE mandatory } |
    { ID id-TraceReference              CRITICALITY ignore  TYPE TraceReference            PRESENCE mandatory  } |
    { ID id-TriggerID               CRITICALITY ignore  TYPE TriggerID                 PRESENCE optional } |
    { ID id-UE-ID                   CRITICALITY ignore  TYPE UE-ID                 PRESENCE optional  } |
    { ID id-OMC-ID                  CRITICALITY ignore  TYPE OMC-ID                PRESENCE optional  },
    ...
}

CN-InvokeTraceExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- CN DEACTIVATE TRACE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- CN Deactivate Trace
```

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

CN-DeactivateTrace ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {CN-DeactivateTraceIEs} },
    protocolExtensions      ProtocolExtensionContainer { {CN-DeactivateTraceExtensions} }           OPTIONAL,
    ...
}

CN-DeactivateTraceIEs RANAP-PROTOCOL-IES ::= {
    { ID id-TraceReference              CRITICALITY ignore  TYPE TraceReference            PRESENCE mandatory } |
    { ID id-TriggerID               CRITICALITY ignore  TYPE TriggerID                 PRESENCE optional },
    ...
}

CN-DeactivateTraceExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- LOCATION REPORTING CONTROL ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Location Reporting Control
--
-- **************************************************************

LocationReportingControl ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LocationReportingControlIEs} },
    protocolExtensions      ProtocolExtensionContainer { {LocationReportingControlExtensions} }     OPTIONAL,
    ...
}

LocationReportingControlIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RequestType                 CRITICALITY ignore  TYPE RequestType               PRESENCE mandatory  },
    ...
}

LocationReportingControlExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- LOCATION REPORT ELEMENTARY PROCEDURE
--
-- **************************************************************
```

```
-- **************************************************************
--
-- Location Report
--
-- **************************************************************

LocationReport ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LocationReportIEs} },
    protocolExtensions      ProtocolExtensionContainer { {LocationReportExtensions} }            OPTIONAL,
    ...
}

LocationReportIEs RANAP-PROTOCOL-IES ::= {
    { ID id-AreaIdentity               CRITICALITY ignore  TYPE AreaIdentity              PRESENCE optional} |
    { ID id-Cause                  CRITICALITY ignore  TYPE Cause                 PRESENCE optional   } |
    { ID id-RequestType                CRITICALITY ignore  TYPE RequestType               PRESENCE conditional
    -- This IE shall be present when Cause IE is present and has value "Requested Report Type not supported" --},
    ...
}

LocationReportExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- INITIAL UE MESSAGE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Initial UE Message
--
-- **************************************************************

InitialUE-Message ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {InitialUE-MessageIEs} },
    protocolExtensions      ProtocolExtensionContainer { {InitialUE-MessageExtensions} }            OPTIONAL,
    ...
}

InitialUE-MessageIEs RANAP-PROTOCOL-IES ::= {
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator            PRESENCE mandatory } |
    { ID id-LAI                CRITICALITY ignore  TYPE LAI                   PRESENCE mandatory   } |
    { ID id-RAC                CRITICALITY ignore  TYPE RAC                   PRESENCE conditional
    -- This IE is only present for RABs towards the PS domain --                                    } |
    { ID id-SAI                CRITICALITY ignore  TYPE SAI                   PRESENCE mandatory   } |
    { ID id-NAS-PDU                CRITICALITY ignore  TYPE NAS-PDU                   PRESENCE mandatory} |
    { ID id-IuSigConId             CRITICALITY ignore  TYPE IuSignallingConnectionIdentifier     PRESENCE mandatory   } |
```

```
    { ID id-GlobalRNC-ID               CRITICALITY ignore  TYPE GlobalRNC-ID              PRESENCE mandatory   },

    ...
}

InitialUE-MessageExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- DIRECT TRANSFER ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Direct Transfer
--
-- **************************************************************

DirectTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {DirectTransferIEs} },
    protocolExtensions      ProtocolExtensionContainer { {DirectTransferExtensions} }            OPTIONAL,
    ...
}

DirectTransferIEs RANAP-PROTOCOL-IES ::= {
    { ID id-NAS-PDU                CRITICALITY ignore  TYPE NAS-PDU                PRESENCE mandatory } |
    { ID id-LAI                CRITICALITY ignore  TYPE LAI                    PRESENCE conditional
    -- This IE is only present if the message is directed to the PS domain --                            } |
    { ID id-RAC                CRITICALITY ignore  TYPE RAC                    PRESENCE conditional
    -- This IE is only present if the message is directed to the PS domain --                            } |
    { ID id-SAI                CRITICALITY ignore  TYPE SAI                    PRESENCE conditional
    -- This IE is only present if the message is directed to the PS domain --                            } |
    { ID id-SAPI                   CRITICALITY ignore  TYPE SAPI                   PRESENCE conditional
    -- This IE is always used in downlink direction--                                                    },
    ...
}

DirectTransferExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- OVERLOAD CONTROL ELEMENTARY PROCEDURE
--
-- **************************************************************

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

```
--
-- Overload
--
-- **************************************************************

Overload ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {OverloadIEs} },
    protocolExtensions      ProtocolExtensionContainer { {OverloadExtensions} }                OPTIONAL,
    ...
}

OverloadIEs RANAP-PROTOCOL-IES ::= {
    { ID id-NumberOfSteps              CRITICALITY ignore  TYPE NumberOfSteps             PRESENCE optional } |
    { ID id-GlobalRNC-ID               CRITICALITY ignore  TYPE GlobalRNC-ID              PRESENCE conditional
    -- This IE is always used in the uplink direction --                                          },
    ...
}

OverloadExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- ERROR INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Error Indication
--
-- **************************************************************

ErrorIndication ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ErrorIndicationIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ErrorIndicationExtensions} }           OPTIONAL,
    ...
}

ErrorIndicationIEs RANAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                  PRESENCE conditional
    -- At least either of Cause IE or Criticality IE shall be present --                              } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE conditional
    -- At least either of Cause IE or Criticality IE shall be present --                              } |
    { ID id-CN-DomainIndicator          CRITICALITY ignore  TYPE CN-DomainIndicator            PRESENCE optional  } |
    { ID id-GlobalRNC-ID                CRITICALITY ignore  TYPE GlobalRNC-ID              PRESENCE conditional
    -- This IE is always used in the uplink direction when message is sent connectionless --                  },
    ...
}
```

```
ErrorIndicationExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- SRNS DATA FORWARD ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- SRNS Data Forward Command
--
-- **************************************************************

SRNS-DataForwardCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {SRNS-DataForwardCommandIEs} },
    protocolExtensions      ProtocolExtensionContainer { {SRNS-DataForwardCommandExtensions} }       OPTIONAL,
    ...
}

SRNS-DataForwardCommandIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-DataForwardingList          CRITICALITY ignore  TYPE RAB-DataForwardingList       PRESENCE conditional
    -- This group is only present for RABs towards the PS domain --                                      },
    ...
}

SRNS-DataForwardCommandExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- FORWARD SRNS CONTEXT ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Forward SRNS Context
--
-- **************************************************************

ForwardSRNS-Context ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ForwardSRNS-ContextIEs} },
    protocolExtensions      ProtocolExtensionContainer { {ForwardSRNS-ContextExtensions} }          OPTIONAL,
    ...
}

ForwardSRNS-ContextIEs RANAP-PROTOCOL-IES ::= {
```

```
    { ID id-RAB-ContextList            CRITICALITY ignore  TYPE RAB-ContextList               PRESENCE mandatory },
    ...
}

ForwardSRNS-ContextExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RAB ASSIGNMENT ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- RAB Assignment Request
--
-- **************************************************************

RAB-AssignmentRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RAB-AssignmentRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RAB-AssignmentRequestExtensions} }        OPTIONAL,
    ...
}

RAB-AssignmentRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupOrModifyList          CRITICALITY ignore  TYPE RAB-SetupOrModifyList       PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |
    { ID id-RAB-ReleaseList            CRITICALITY ignore  TYPE RAB-ReleaseList               PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          },
    ...
}

RAB-SetupOrModifyList                  ::= RAB-IE-ContainerPairList { {RAB-SetupOrModifyItem-IEs} }

RAB-SetupOrModifyItem-IEs RANAP-PROTOCOL-IES-PAIR ::= {
    { ID id-RAB-SetupOrModifyItem          FIRST CRITICALITY  reject   FIRST TYPE  RAB-SetupOrModifyItemFirst
                           SECOND CRITICALITY ignore   SECOND TYPE RAB-SetupOrModifyItemSecond
                                                        PRESENCE mandatory  },
    ...
}

RAB-SetupOrModifyItemFirst ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    nAS-SynchronisationIndicator    NAS-SynchronisationIndicator    OPTIONAL
    -- This IE is present at a RAB modification if the relevant NAS information is provided by the CN --,
    rAB-Parameters                  RAB-Parameters      OPTIONAL
    -- This IE is present at a RAB establishment or when any previously set value shall be modified at a RAB modification --,
    userPlaneInformation                UserPlaneInformation        OPTIONAL
    -- This IE is present only at a RAB establishment --,
```

```
    transportLayerInformation              TransportLayerInformation      OPTIONAL
    -- This IE must not be present if the only other IEs included at a RAB modification are the RAB ID and the NAS Syncronisation Indicator --,
    service-Handover                   Service-Handover           OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { {RAB-SetupOrModifyItemFirst-ExtIEs} }       OPTIONAL,
    ...
}

TransportLayerInformation ::= SEQUENCE {
    transportLayerAddress          TransportLayerAddress,
    iuTransportAssociation         IuTransportAssociation,
    iE-Extensions                  ProtocolExtensionContainer { {TransportLayerInformation-ExtIEs} }        OPTIONAL,
    ...
}

TransportLayerInformation-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-SetupOrModifyItemFirst-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-SetupOrModifyItemSecond ::= SEQUENCE {
    pDP-TypeInformation            PDP-TypeInformation            OPTIONAL
    -- This IE is only present for RABs towards the PS domain at RAB establishment --,
    dataVolumeReportingIndication          DataVolumeReportingIndication   OPTIONAL
    -- This IE, if applicable, is only present for RABs towards the PS domain at RAB establishment --,
    dl-GTP-PDU-SequenceNumber          DL-GTP-PDU-SequenceNumber   OPTIONAL
    -- This IE, if available, is only present for RABs towards the PS domain at RAB establishment --,
    ul-GTP-PDU-SequenceNumber          UL-GTP-PDU-SequenceNumber   OPTIONAL
    -- This IE, if available, is only present for RABs towards the PS domain at RAB establishment --,
    dl-N-PDU-SequenceNumber            DL-N-PDU-SequenceNumber     OPTIONAL
    -- This IE, if available, is only present for RABs towards the PS domain at RAB establishment --,
    ul-N-PDU-SequenceNumber            UL-N-PDU-SequenceNumber     OPTIONAL
    -- This IE, if available, is only present for RABs towards the PS domain at RAB establishment --,
    iE-Extensions                  ProtocolExtensionContainer { {RAB-SetupOrModifyItemSecond-ExtIEs} }      OPTIONAL,
    ...
}

RAB-SetupOrModifyItemSecond-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-AssignmentRequestExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- RAB Assignment Response
--
```

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

RAB-AssignmentResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RAB-AssignmentResponseIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RAB-AssignmentResponseExtensions} }       OPTIONAL,
    ...
}

RAB-AssignmentResponseIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupOrModifiedList         CRITICALITY ignore  TYPE RAB-SetupOrModifiedList        PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |
    { ID id-RAB-ReleasedList            CRITICALITY ignore  TYPE RAB-ReleasedList               PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |

    { ID id-RAB-QueuedList              CRITICALITY ignore  TYPE RAB-QueuedList             PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |
    { ID id-RAB-FailedList              CRITICALITY ignore  TYPE RAB-FailedList             PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |
    { ID id-RAB-ReleaseFailedList           CRITICALITY ignore  TYPE RAB-ReleaseFailedList       PRESENCE conditional
    -- This group must be present at least when no other group is present, ie. at least one group must be present --          } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional },
    ...
}

RAB-SetupOrModifiedList                 ::= RAB-IE-ContainerList { {RAB-SetupOrModifiedItemIEs} }

RAB-SetupOrModifiedItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-SetupOrModifiedItem         CRITICALITY ignore  TYPE RAB-SetupOrModifiedItem        PRESENCE mandatory   },
    ...
}

RAB-SetupOrModifiedItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    transportLayerAddress               TransportLayerAddress   OPTIONAL
    -- This IE is only present for RABs towards the PS domain --,
    iuTransportAssociation              IuTransportAssociation  OPTIONAL
    -- This IE is only present for RABs towards the PS domain --,
    dl-dataVolumes                  DataVolumeList      OPTIONAL
    -- This IE is only present if the RAB has been modified and --
    -- RAB data volume reporting for PS domain is required  --,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-SetupOrModifiedItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-SetupOrModifiedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ReleasedList                    ::= RAB-IE-ContainerList { {RAB-ReleasedItemIEs} }

RAB-ReleasedItemIEs RANAP-PROTOCOL-IES ::= {
```

```
    { ID id-RAB-ReleasedItem            CRITICALITY ignore  TYPE RAB-ReleasedItem               PRESENCE mandatory },
    ...
}

RAB-ReleasedItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    dl-dataVolumes                  DataVolumeList      OPTIONAL
    -- This IE is only present if data volume reporting for PS domain is required --,
    dL-GTP-PDU-SequenceNumber       DL-GTP-PDU-SequenceNumber           OPTIONAL
    -- This IE is only present for RABs towards the PS domain when available and when the release is UTRAN initiated --  ,
    uL-GTP-PDU-SequenceNumber       UL-GTP-PDU-SequenceNumber           OPTIONAL
    -- This IE is only present for RABs towards the PS domain when available and when the release is UTRAN initiated --  ,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-ReleasedItem-ExtIEs} }        OPTIONAL,
    ...
}

RAB-ReleasedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

DataVolumeList ::= SEQUENCE (SIZE (1..maxNrOfVol)) OF
    SEQUENCE {
        dl-UnsuccessfullyTransmittedDataVolume      UnsuccessfullyTransmittedDataVolume,
        dataVolumeReference             DataVolumeReference OPTIONAL,
        iE-Extensions                   ProtocolExtensionContainer { {DataVolumeList-ExtIEs} }      OPTIONAL,
        ...
    }

DataVolumeList-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-QueuedList                      ::= RAB-IE-ContainerList { {RAB-QueuedItemIEs} }

RAB-QueuedItemIEs RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-QueuedItem              CRITICALITY ignore  TYPE RAB-QueuedItem             PRESENCE mandatory  },
    ...
}

RAB-QueuedItem ::= SEQUENCE {
    rAB-ID                      RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-QueuedItem-ExtIEs} }       OPTIONAL,
    ...
}

RAB-QueuedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ReleaseFailedList ::= RAB-FailedList
```

```
RAB-AssignmentResponseExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- PRIVATE MESSAGE
--
-- **************************************************************

PrivateMessage ::= SEQUENCE {
    privateIEs      PrivateIE-Container  { {PrivateMessage-IEs } },
    ...
}

PrivateMessage-IEs RANAP-PRIVATE-IES ::= {
    ...
}

-- **************************************************************
--
-- RANAP RELOCATION INFORMATION ELEMENTARY PROCEDURE
--
-- **************************************************************

RANAP-RelocationInformation ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {RANAP-RelocationInformationIEs} },
    protocolExtensions      ProtocolExtensionContainer { {RANAP-RelocationInformationExtensions} }        OPTIONAL,
    ...
}

RANAP-RelocationInformationIEs RANAP-PROTOCOL-IES ::= {
    { ID id-DirectTransferInformationList-RANAP-RelocInf
                            CRITICALITY ignore  TYPE DirectTransferInformationList-RANAP-RelocInf
                                                     PRESENCE optional   } |
    { ID id-RAB-ContextList-RANAP-RelocInf      CRITICALITY ignore  TYPE RAB-ContextList-RANAP-RelocInf    PRESENCE optional },
    ...
}

DirectTransferInformationList-RANAP-RelocInf        ::= DirectTransfer-IE-ContainerList { {DirectTransferInformationItemIEs-RANAP-RelocInf} }

DirectTransferInformationItemIEs-RANAP-RelocInf RANAP-PROTOCOL-IES ::= {
    { ID id-DirectTransferInformationItem-RANAP-RelocInf
                            CRITICALITY ignore  TYPE DirectTransferInformationItem-RANAP-RelocInf
                                                     PRESENCE mandatory  },
    ...
}

DirectTransferInformationItem-RANAP-RelocInf ::= SEQUENCE {
    nAS-PDU                     NAS-PDU,
    sAPI                        SAPI,
```

```
    cN-DomainIndicator          CN-DomainIndicator,
    iE-Extensions                   ProtocolExtensionContainer { {RANAP-DirectTransferInformationItem-ExtIEs-RANAP-RelocInf} }       OPTIONAL,
    ...
}

RANAP-DirectTransferInformationItem-ExtIEs-RANAP-RelocInf RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-ContextList-RANAP-RelocInf              ::= RAB-IE-ContainerList { {RAB-ContextItemIEs-RANAP-RelocInf} }

RAB-ContextItemIEs-RANAP-RelocInf RANAP-PROTOCOL-IES ::= {
    { ID id-RAB-ContextItem-RANAP-RelocInf      CRITICALITY ignore  TYPE RAB-ContextItem-RANAP-RelocInf      PRESENCE mandatory   },
    ...
}

RAB-ContextItem-RANAP-RelocInf ::= SEQUENCE {
    rAB-ID              RAB-ID,
    dl-GTP-PDU-SequenceNumber           DL-GTP-PDU-SequenceNumber   OPTIONAL
    --This IE is only present when available--,
    ul-GTP-PDU-SequenceNumber           UL-GTP-PDU-SequenceNumber   OPTIONAL
    --This IE is only present when available--,
    dl-N-PDU-SequenceNumber             DL-N-PDU-SequenceNumber     OPTIONAL
    --This IE is only present when available--,
    ul-N-PDU-SequenceNumber             UL-N-PDU-SequenceNumber     OPTIONAL
    --This IE is only present when available--,
    iE-Extensions                   ProtocolExtensionContainer { {RAB-ContextItem-ExtIEs-RANAP-RelocInf} }      OPTIONAL,
    ...
}

RAB-ContextItem-ExtIEs-RANAP-RelocInf RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RANAP-RelocationInformationExtensions RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

END
```

9.3.4 Information Element Definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************

RANAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
```

```
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxNrOfPDPDirections,
    maxNrOfPoints,
    maxNrOfRABs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination

FROM RANAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
FROM RANAP-CommonDataTypes

    ProtocolExtensionContainer{},
    RANAP-PROTOCOL-EXTENSION
FROM RANAP-Containers;

-- A

AllocationOrRetentionPriority ::= SEQUENCE {
    priorityLevel           PriorityLevel,
    pre-emptionCapability       Pre-emptionCapability,
    pre-emptionVulnerability    Pre-emptionVulnerability,
    queuingAllowed          QueuingAllowed,
    iE-Extensions           ProtocolExtensionContainer { {AllocationOrRetentionPriority-ExtIEs} } OPTIONAL,
    ...
}

AllocationOrRetentionPriority-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

AreaIdentity ::= CHOICE {
    sAI             SAI,
    geographicalArea        GeographicalArea,
    ...
}

-- B

BindingID               ::= OCTET STRING (SIZE (4))
```

```
-- C


Cause ::= CHOICE {
    radioNetwork            CauseRadioNetwork,
    transmissionNetwork     CauseTransmissionNetwork,
    nAS             CauseNAS,
    protocol            CauseProtocol,
    misc                CauseMisc,
    non-Standard            CauseNon-Standard,
    ...
}

CauseMisc ::= INTEGER {
    om-intervention (113),
    no-resource-available (114),
    unspecified-failure (115),
    network-optimisation (116)
} (113..128)

CauseNAS ::= INTEGER {
    user-restriction-start-indication (81),
    user-restriction-end-indication (82),
    normal-release (83)
} (81..96)

CauseProtocol ::= INTEGER {
    transfer-syntax-error (97),
    semantic-error (98),
    message-not-compatible-with-receiver-state (99),
    abstract-syntax-error-reject (100),
    abstract-syntax-error-ignore-and-notify (101),
    abstract-syntax-error-falsely-constructed-message (102)

} (97..112)

CauseRadioNetwork ::= INTEGER {
    rab-pre-empted (1),
    trelocoverall-expiry (2),
    trelocprep-expiry (3),
    treloccomplete-expiry (4),
    tqueing-expiry (5),
    relocation-triggered (6),
    trellocalloc-expiry(7),
    unable-to-establish-during-relocation (8),
    unknown-target-rnc (9),
    relocation-cancelled (10),
    successful-relocation (11),
    requested-ciphering-and-or-integrity-protection-algorithms-not-supported (12),
    change-of-ciphering-and-or-integrity-protection-is-not-supported (13),
```

```
    failure-in-the-radio-interface-procedure (14),
    release-due-to-utran-generated-reason (15),
    user-inactivity (16),
    time-critical-relocation (17),
    requested-traffic-class-not-available (18),
    invalid-rab-parameters-value (19),
    requested-maximum-bit-rate-not-available (20),
    requested-guaranteed-bit-rate-not-available (21),
    requested-transfer-delay-not-achievable (22),
    invalid-rab-parameters-combination (23),
    condition-violation-for-sdu-parameters (24),
    condition-violation-for-traffic-handling-priority (25),
    condition-violation-for-guaranteed-bit-rate (26),
    user-plane-versions-not-supported (27),
    iu-up-failure (28),
    relocation-failure-in-target-CN-RNC-or-target-system(29),
    invalid-RAB-ID (30),
    no-remaining-rab (31),
    interaction-with-other-procedure (32),
    requested-maximum-bit-rate-for-dl-not-available (33),
    requested-maximum-bit-rate-for-ul-not-available (34),
    requested-guaranteed-bit-rate-for-dl-not-available (35),
    requested-guaranteed-bit-rate-for-ul-not-available (36),
    repeated-integrity-checking-failure (37),
    requested-report-type-not-supported (38),
    request-superseded (39),
    release-due-to-UE-generated-signalling-connection-release (40),
    resource-optimisation-relocation (41),
    requested-information-not-available (42),
    relocation-desirable-for-radio-reasons (43),
    relocation-not-supported-in-target-RNC-or-target-system (44),
    directed-retry (45),
    radio-connection-with-UE-Lost (46)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)

CauseTransmissionNetwork ::= INTEGER {
    signalling-transport-resource-failure (65),
    iu-transport-connection-failed-to-establish (66)
} (65..80)


CriticalityDiagnostics ::= SEQUENCE {
    procedureCode           ProcedureCode           OPTIONAL,
    triggeringMessage       TriggeringMessage       OPTIONAL,
    procedureCriticality        Criticality         OPTIONAL,
    iEsCriticalityDiagnostics       CriticalityDiagnostics-IE-List  OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {CriticalityDiagnostics-ExtIEs} } OPTIONAL,
    ...
}
```

```
CriticalityDiagnostics-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxNrOfErrors)) OF
    SEQUENCE {
        iECriticality       Criticality,
        iE-ID               ProtocolIE-ID,
        repetitionNumber        RepetitionNumber        OPTIONAL,
        iE-Extensions           ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} } OPTIONAL,
        ...
    }

CriticalityDiagnostics-IE-List-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

CGI ::= SEQUENCE {
    pLMN-ID             PLMN-ID,
    lAC             LAC,
    cI              CI,
    iE-Extensions           ProtocolExtensionContainer { {CGI-ExtIEs} } OPTIONAL
}

CGI-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

ChosenEncryptionAlgorithm       ::= EncryptionAlgorithm

ChosenIntegrityProtectionAlgorithm  ::= IntegrityProtectionAlgorithm

CI                  ::= OCTET STRING (SIZE (2))

ClassmarkInformation2           ::= OCTET STRING

ClassmarkInformation3           ::= OCTET STRING

CN-DomainIndicator ::= ENUMERATED {
    cs-domain,
    ps-domain
}



-- D

DataVolumeReference         ::= INTEGER (0..255)

DataVolumeReportingIndication ::= ENUMERATED {
```

```
    do-report,
    do-not-report
}

DCH-ID ::= INTEGER (0..255)

DeliveryOfErroneousSDU ::= ENUMERATED {
    yes,
    no,
    no-error-detection-consideration
}

DeliveryOrder::= ENUMERATED {
    delivery-order-requested,
    delivery-order-not-requested
}

DL-GTP-PDU-SequenceNumber       ::= INTEGER (0..65535)
-- Reference: xx.xxx

DL-N-PDU-SequenceNumber         ::= INTEGER (0..65535)
-- Reference: xx.xxx

D-RNTI                  ::= INTEGER (0..1048575)

DRX-CycleLengthCoefficient          ::= INTEGER (6..9)

DSCH-ID ::= INTEGER (0..255)

-- E

EncryptionAlgorithm             ::= INTEGER { no-encryption (0), standard-UMTS-encryption-algorith-UEA1 (1) } (0..15)

EncryptionInformation ::= SEQUENCE {
    permittedAlgorithms     PermittedEncryptionAlgorithms,
    key             EncryptionKey,
    iE-Extensions           ProtocolExtensionContainer { {EncryptionInformation-ExtIEs} } OPTIONAL
}

EncryptionInformation-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

EncryptionKey               ::= BIT STRING (SIZE (128))
-- Reference: 33.102

Event ::= ENUMERATED {
    stop,
    direct,
    change-of-servicearea,
    ...
```

```
}

-- F
-- G

GeographicalArea ::= CHOICE {
    point               GA-Point,
    pointWithUnCertainty        GA-PointWithUnCertainty,
    polygon             GA-Polygon,
    ...
}

GeographicalCoordinates ::= SEQUENCE {
    latitudeSign            ENUMERATED { north, south },
    latitude            INTEGER (0..8388607),
    longitude           INTEGER (-8388608..8388607),
    iE-Extensions           ProtocolExtensionContainer { {GeographicalCoordinates-ExtIEs} } OPTIONAL,
    ...
}

GeographicalCoordinates-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

GA-Point ::= SEQUENCE {
    geographicalCoordinates     GeographicalCoordinates,
    iE-Extensions           ProtocolExtensionContainer { {GA-Point-ExtIEs} } OPTIONAL,
    ...
}

GA-Point-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

GA-PointWithUnCertainty ::=SEQUENCE {
    geographicalCoordinates     GeographicalCoordinates,
    iE-Extensions           ProtocolExtensionContainer { {GA-PointWithUnCertainty-ExtIEs} } OPTIONAL,
    uncertaintyCode         INTEGER (0..127)
}

GA-PointWithUnCertainty-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

GA-Polygon ::= SEQUENCE (SIZE (1..maxNrOfPoints)) OF
    SEQUENCE {
        geographicalCoordinates     GeographicalCoordinates,
        iE-Extensions           ProtocolExtensionContainer { {GA-Polygon-ExtIEs} } OPTIONAL,
        ...
    }
```

```
GA-Polygon-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

GlobalRNC-ID ::= SEQUENCE {
    pLMN-ID             PLMN-ID,
    rNC-ID              RNC-ID
}

GTP-TEI                 ::= OCTET STRING (SIZE (4))
-- Reference: xx.xxx

GuaranteedBitrate           ::= INTEGER (0..16000000)
-- Unit is bits per sec

-- H

-- I


IMEI                    ::= OCTET STRING (SIZE (8))
-- Reference: 23.003

IMSI                    ::= TBCD-STRING (SIZE (3..8))
-- Reference: 23.003

IntegrityProtectionAlgorithm        ::= INTEGER { standard-UMTS-integrity-algorithm-UIA1 (0) } (0..15)

IntegrityProtectionInformation ::= SEQUENCE {
    permittedAlgorithms     PermittedIntegrityProtectionAlgorithms,
    key             IntegrityProtectionKey,
    iE-Extensions           ProtocolExtensionContainer { {IntegrityProtectionInformation-ExtIEs} } OPTIONAL
}

IntegrityProtectionInformation-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

IntegrityProtectionKey          ::= BIT STRING (SIZE (128))

IuSignallingConnectionIdentifier    ::= BIT STRING (SIZE (24))

IuTransportAssociation ::= CHOICE {
    gTP-TEI             GTP-TEI,
    bindingID           BindingID,
    ...
}

-- J
-- K
```

```
KeyStatus   ::= ENUMERATED {
    old,
    new,
    ...
}
-- L

LAC                 ::= OCTET STRING (SIZE (2))

LAI ::= SEQUENCE {
    pLMN-ID             PLMN-ID,
    lAC             LAC,
    iE-Extensions           ProtocolExtensionContainer { {LAI-ExtIEs} } OPTIONAL
}

LAI-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

L3-Information              ::= OCTET STRING

-- M

MaxBitrate              ::= INTEGER (1..16000000)
-- Unit is bits per sec

MaxSDU-Size             ::= INTEGER (0..32768)
-- MaxSDU-Size
-- Unit is bit

MCC                 ::= TBCD-STRING (SIZE (2))
-- Reference: 24.008

MNC                 ::= TBCD-STRING (SIZE (2))
-- Reference: 24.008

-- N


NAS-PDU                 ::= OCTET STRING

NAS-SynchronisationIndicator    ::= BIT STRING (SIZE (4))

NonSearchingIndication ::= ENUMERATED {
    non-searching,
    searching
}

NumberOfIuInstances         ::= INTEGER (1..2)

NumberOfSteps               ::= INTEGER (1..16)
```

```
-- O

OldBSS-ToNewBSS-Information     ::= OCTET STRING

OMC-ID                  ::= OCTET STRING (SIZE (3..22))
-- Reference: GSM TS 12.20

-- P

PagingAreaID ::= CHOICE {
    lAI             LAI,
    rAI             RAI,
    ...
}

PagingCause ::= ENUMERATED {
    terminating-conversational-call,
    terminating-streaming-call,
    terminating-interactive-call,
    terminating-background-call,
    sms,
    ...
}

PDP-TypeInformation ::= SEQUENCE (SIZE (1..maxNrOfPDPDirections)) OF
    PDP-Type

PDP-Type ::= ENUMERATED {
    empty,
    ppp,
    osp-ihoss  -- this value is used for OSP:IHOSS -- ,
    ipv4,
    ipv6,
    ...
}

PermanentNAS-UE-ID ::= CHOICE {
    iMSI                IMSI,
    ...
}

PermittedEncryptionAlgorithms ::= SEQUENCE (SIZE (1..16)) OF
    EncryptionAlgorithm

PermittedIntegrityProtectionAlgorithms ::= SEQUENCE (SIZE (1..16)) OF
    IntegrityProtectionAlgorithm

PLMN-ID                 ::= TBCD-STRING (SIZE (3))

Pre-emptionCapability ::= ENUMERATED {
```

```
    shall-not-trigger-pre-emption,
    may-trigger-pre-emption
}

Pre-emptionVulnerability ::= ENUMERATED {
    not-pre-emptable,
    pre-emptable
}

PriorityLevel               ::= INTEGER { spare (0), highest (1), lowest (14), no-priority (15) } (0..15)

P-TMSI                  ::= OCTET STRING (SIZE (4))

-- Q

QueuingAllowed ::= ENUMERATED {
    queueing-not-allowed,
    queueing-allowed
}

-- R
RAB-AsymmetryIndicator::= ENUMERATED {
    symmetric-bidirectional,
    asymmetric-unidirectional-downlink,
    asymmetric-unidirectional-uplink,
    asymmetric-bidirectional,
    ...
}

RAB-ID                  ::= BIT STRING (SIZE (8))

RAB-Parameter-GuaranteedBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF GuaranteedBitrate

RAB-Parameter-MaxBitrateList        ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF MaxBitrate

RAB-Parameters ::= SEQUENCE {
    trafficClass            TrafficClass,
    rAB-AsymmetryIndicator          RAB-AsymmetryIndicator,
    maxBitrate          RAB-Parameter-MaxBitrateList,
    guaranteedBitRate       RAB-Parameter-GuaranteedBitrateList OPTIONAL
    -- This IE is only present when traffic class indicates Conversational or Streaming --,
    deliveryOrder           DeliveryOrder,
    maxSDU-Size         MaxSDU-Size,
    sDU-Parameters          SDU-Parameters,
    transferDelay           TransferDelay OPTIONAL
    -- This IE is only present when traffic class indicates Conversational or Streaming --,
    trafficHandlingPriority     TrafficHandlingPriority OPTIONAL
    -- This IE is only present when traffic class indicates Interactiv --,
    allocationOrRetentionPriority   AllocationOrRetentionPriority OPTIONAL,
    sourceStatisticsDescriptor  SourceStatisticsDescriptor OPTIONAL
    -- This IE is only present when traffic class indicates Conversational or Streaming --,
```

```
    relocationRequirement   RelocationRequirement OPTIONAL
    -- This IE is only present for RABs towards the PS domain --,
    iE-Extensions           ProtocolExtensionContainer { {RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

RAB-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RAB-SubflowCombinationBitRate   ::= INTEGER (0..16000000)

RAB-TrCH-Mapping ::=    SEQUENCE ( SIZE (1..maxNrOfRABs)) OF
    RAB-TrCH-MappingItem

RAB-TrCH-MappingItem ::= SEQUENCE {
    rAB-ID          RAB-ID,
    trCH-ID-List    TrCH-ID-List,
    ...
}

RAC                 ::= OCTET STRING (SIZE (1))

RAI ::= SEQUENCE {
    lAI             LAI,
    rAC             RAC,
    iE-Extensions           ProtocolExtensionContainer { {RAI-ExtIEs} } OPTIONAL,
    ...
}

RAI-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RateControlAllowed ::= ENUMERATED {
    not-allowed,
    allowed
}

RelocationRequirement ::= ENUMERATED {
    lossless,
    none,
    ...
}

RelocationType ::= ENUMERATED {
    ue-not-involved,
    ue-involved,
    ...
}
```

```
RepetitionNumber ::= INTEGER (1..256)

ReportArea ::= ENUMERATED {
    service-area,
    geographical-coordinates,
    ...
}

RequestType ::= SEQUENCE {
    event               Event,
    reportArea          ReportArea,
    accuracyCode        INTEGER (0..127)    OPTIONAL,
    -- To be used if Geographical Coordinates shall be reported with a requested accuracy. --
    ...
}

ResidualBitErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..8),
    iE-Extensions           ProtocolExtensionContainer { {ResidualBitErrorRatio-ExtIEs} } OPTIONAL
}
-- ResidualBitErrorRatio = mantissa * 10^-exponent

ResidualBitErrorRatio-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

RNC-ID                  ::= INTEGER (0..4095)
-- RNC-ID                   ::= BIT STRING (SIZE (12))
-- Harmonized with RNSAP and NBAP definitions

RRC-Container               ::= OCTET STRING

-- S

SAC                 ::= OCTET STRING (SIZE (2))

SAI ::= SEQUENCE {
    pLMN-ID             PLMN-ID,
    lAC             LAC,
    sAC             SAC,
    iE-Extensions           ProtocolExtensionContainer { {SAI-ExtIEs} } OPTIONAL
}

SAI-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SAPI ::= ENUMERATED {
    sapi-0,
    sapi-3,
```

```
    ...
}

SDU-ErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..6),
    iE-Extensions           ProtocolExtensionContainer { {SDU-ErrorRatio-ExtIEs} } OPTIONAL
}
-- SDU-ErrorRatio = mantissa * 10^-exponent

SDU-ErrorRatio-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
SDU-FormatInformationParameters ::= SEQUENCE (SIZE (1..maxRAB-SubflowCombination)) OF
    SEQUENCE {
        subflowSDU-Size         SubflowSDU-Size     OPTIONAL
        -- This IE is only present for RABs that have predefined SDU size(s) --,
        rAB-SubflowCombinationBitRate   RAB-SubflowCombinationBitRate   OPTIONAL
        -- At least either of subflowSDU-Size or rABsubflowCombinationBitRate --
        -- shall be present when SDUformatInformationParameter is present --,
        iE-Extensions           ProtocolExtensionContainer { {SDU-FormatInformationParameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-FormatInformationParameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SDU-Parameters ::= SEQUENCE (SIZE (1..maxRAB-Subflows)) OF
    SEQUENCE {
        sDU-ErrorRatio          SDU-ErrorRatio OPTIONAL
        -- This IE is not present when DeliveryOfErroneousSDU is set to no-error-detection-consideration --,
        residualBitErrorRatio       ResidualBitErrorRatio,
        deliveryOfErroneousSDU      DeliveryOfErroneousSDU,
        sDU-FormatInformationParameters SDU-FormatInformationParameters OPTIONAL
        -- When signalled, this IE indicates that the RAB is rate controllable --,
        iE-Extensions           ProtocolExtensionContainer { {SDU-Parameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Service-Handover ::= ENUMERATED {
    handover-to-GSM-should-be-performed,
    handover-to-GSM-should-not-be-performed,
    handover-to-GSM-shall-not-be-performed,
    ...
}
```

```
SourceID ::= CHOICE {
    sourceRNC-ID            SourceRNC-ID, -- If UMTS target
    sAI             SAI,          -- if GSM target
    ...
}


SourceRNC-ID ::= SEQUENCE {
    pLMN-ID             PLMN-ID,
    rNC-ID              RNC-ID,
    iE-Extensions           ProtocolExtensionContainer { {SourceRNC-ID-ExtIEs} } OPTIONAL
}

SourceRNC-ID-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SourceRNC-ToTargetRNC-TransparentContainer ::= SEQUENCE {
    rRC-Container           RRC-Container,
    numberOfIuInstances     NumberOfIuInstances,
    relocationType          RelocationType,
    chosenIntegrityProtectionAlgorithm ChosenIntegrityProtectionAlgorithm   OPTIONAL
    -- Must be present for intra UMTS Handovers if available --,
    integrityProtectionKey      IntegrityProtectionKey          OPTIONAL
    -- Must be present for intra UMTS Handovers if available --,
    chosenEncryptionAlgorithmForSignalling ChosenEncryptionAlgorithm     OPTIONAL
    -- Must be present for intra UMTS Handovers if ciphering is active --,
    cipheringKey            EncryptionKey               OPTIONAL
    -- Must be present for intra UMTS Handovers if ciphering is active --,
    chosenEncryptionAlgorithmForCS   ChosenEncryptionAlgorithm       OPTIONAL
    -- Must be present for intra UMTS Handovers if ciphering is active --,
    chosenEncryptionAlgorithmForPS   ChosenEncryptionAlgorithm       OPTIONAL
    -- Must be present for intra UMTS Handovers if ciphering is active --,
    d-RNTI              D-RNTI                  OPTIONAL
    -- Included for SRNS Relocation without UE involvement --,
    targetCellId            TargetCellId                OPTIONAL
    -- Included for SRNS Relocation with UE involvement --,
    rAB-TrCH-Mapping            RAB-TrCH-Mapping                OPTIONAL
    -- Included for SRNS Relocation without UE involvement and     --
    -- if RABs are carried on DCH, USCH or DSCH transport channels --,
    iE-Extensions           ProtocolExtensionContainer { {SourceRNC-ToTargetRNC-TransparentContainer-ExtIEs} } OPTIONAL,
    ...
}

SourceRNC-ToTargetRNC-TransparentContainer-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SourceStatisticsDescriptor ::= ENUMERATED {
    speech,
    unknown,
```

```
    ...
}

SubflowSDU-Size             ::= INTEGER (0..4095)
-- Unit is bit


-- T

TargetCellId                ::= INTEGER (0..268435455)

TargetID ::= CHOICE {
    targetRNC-ID            TargetRNC-ID, -- If UMTS target
    cGI             CGI,          -- If GSM target
    ...
}




TargetRNC-ID ::= SEQUENCE {
    lAI             LAI,
    rAC             RAC         OPTIONAL
    -- Must always be present towards the PS domain and never towards the CS domain --,
    rNC-ID              RNC-ID,
    iE-Extensions           ProtocolExtensionContainer { {TargetRNC-ID-ExtIEs} } OPTIONAL
}

TargetRNC-ID-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

TargetRNC-ToSourceRNC-TransparentContainer ::= SEQUENCE {
    rRC-Container           RRC-Container,
    d-RNTI                  D-RNTI                  OPTIONAL
    -- May be included to allow the triggering of the Relocation Detect procedure from the Iur Interface --,
    iE-Extensions           ProtocolExtensionContainer { {TargetRNC-ToSourceRNC-TransparentContainer-ExtIEs} } OPTIONAL,
    ...
}

TargetRNC-ToSourceRNC-TransparentContainer-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

TBCD-STRING                 ::= OCTET STRING

TemporaryUE-ID ::= CHOICE {
    tMSI                TMSI,
    p-TMSI              P-TMSI,
    ...
}
```

```
TMSI                    ::= OCTET STRING (SIZE (4))

TraceReference              ::= OCTET STRING (SIZE (2..3))

TraceType               ::= OCTET STRING (SIZE (1))
-- Reference: GSM TS 12.08

TrafficClass ::= ENUMERATED {
    conversational,
    streaming,
    interactive,
    background,
    ...
}

TrafficHandlingPriority         ::= INTEGER { spare (0), highest (1), lowest (14), no-priority-used (15) } (0..15)

TransferDelay               ::= INTEGER (0..65535)
-- Unit is millisecond

UnsuccessfullyTransmittedDataVolume ::= INTEGER (0..4294967295)

TransportLayerAddress           ::= BIT STRING (SIZE (1..160, ...))

TrCH-ID ::= SEQUENCE {
    dCH-ID              DCH-ID      OPTIONAL
    -- At least one of these IEs shall be included --,
    dSCH-ID             DSCH-ID     OPTIONAL
    -- At least one of these IEs shall be included --,
    uSCH-ID             USCH-ID     OPTIONAL
    -- At least one of these IEs shall be included --,
    ...
}

TrCH-ID-List ::=  SEQUENCE (SIZE (1..maxRAB-Subflows)) OF
    TrCH-ID

TriggerID               ::= OCTET STRING (SIZE (3..22))

-- U

UE-ID ::= CHOICE {
    imsi                IMSI,
    imei                IMEI,
    ...
}

UL-GTP-PDU-SequenceNumber       ::= INTEGER (0..65535)

UL-N-PDU-SequenceNumber         ::= INTEGER (0..65535)
```

```
UP-ModeVersions             ::= BIT STRING (SIZE (16))

USCH-ID                     ::= INTEGER (0..255)

UserPlaneMode ::= ENUMERATED {
    transparent-mode,
    support-mode-for-predefined-SDU-sizes,
    ...
}

END
```

9.3.5 Common Definitions

```
-- **************************************************************
--
-- Common definitions
--
-- **************************************************************

RANAP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-CommonDataTypes (3)  }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

Criticality     ::= ENUMERATED { reject, ignore, notify }

Presence        ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID    ::= CHOICE {
    local               INTEGER (0..65535),
    global              OBJECT IDENTIFIER
}

ProcedureCode       ::= INTEGER (0..255)

ProtocolExtensionID ::= INTEGER (0..65535)

ProtocolIE-ID       ::= INTEGER (0..65535)

TriggeringMessage   ::= ENUMERATED { initiating-message, successful-outcome, unsuccessfull-outcome, outcome }

END
```

9.3.6 Constant Definitions

```
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************

RANAP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- Elementary Procedures
--
-- **************************************************************

id-RAB-Assignment                   INTEGER ::= 0
id-Iu-Release                       INTEGER ::= 1
id-RelocationPreparation            INTEGER ::= 2
id-RelocationResourceAllocation     INTEGER ::= 3
id-RelocationCancel                 INTEGER ::= 4
id-SRNS-ContextTransfer             INTEGER ::= 5
id-SecurityModeControl              INTEGER ::= 6
id-DataVolumeReport                 INTEGER ::= 7
id-Reset                            INTEGER ::= 9
id-RAB-ReleaseRequest               INTEGER ::= 10
id-Iu-ReleaseRequest                INTEGER ::= 11
id-RelocationDetect                 INTEGER ::= 12
id-RelocationComplete               INTEGER ::= 13
id-Paging                           INTEGER ::= 14
id-CommonID                         INTEGER ::= 15
id-CN-InvokeTrace                   INTEGER ::= 16
id-LocationReportingControl         INTEGER ::= 17
id-LocationReport                   INTEGER ::= 18
id-InitialUE-Message                INTEGER ::= 19
id-DirectTransfer                   INTEGER ::= 20
id-OverloadControl                  INTEGER ::= 21
id-ErrorIndication                  INTEGER ::= 22
id-SRNS-DataForward                 INTEGER ::= 23
id-ForwardSRNS-Context              INTEGER ::= 24
id-privateMessage                   INTEGER ::= 25
id-CN-DeactivateTrace               INTEGER ::= 26
id-ResetResource                    INTEGER ::= 27
id-RANAP-Relocation                 INTEGER ::= 28
```

```
-- **************************************************************
--
-- Extension constants
--
-- **************************************************************

maxPrivateIEs                       INTEGER ::= 65535
maxProtocolExtensions               INTEGER ::= 65535
maxProtocolIEs                      INTEGER ::= 65535

-- **************************************************************
--
-- Lists
--
-- **************************************************************

maxNrOfDTs                          INTEGER ::= 15
maxNrOfErrors                       INTEGER ::= 256
maxNrOfIuSigConIds                  INTEGER ::= 250
maxNrOfPDPDirections                INTEGER ::= 2
maxNrOfPoints                       INTEGER ::= 15
maxNrOfRABs                         INTEGER ::= 256
maxNrOfSeparateTrafficDirections    INTEGER ::= 2
maxNrOfVol                          INTEGER ::= 2

maxRAB-Subflows                     INTEGER ::= 7
maxRAB-SubflowCombination           INTEGER ::= 64

-- **************************************************************
--
-- IEs
--
-- **************************************************************

id-AreaIdentity                                 INTEGER ::= 0
id-CN-DomainIndicator                           INTEGER ::= 3
id-Cause                                        INTEGER ::= 4
id-ChosenEncryptionAlgorithm                    INTEGER ::= 5
id-ChosenIntegrityProtectionAlgorithm           INTEGER ::= 6
id-ClassmarkInformation2                        INTEGER ::= 7
id-ClassmarkInformation3                        INTEGER ::= 8
id-CriticalityDiagnostics                       INTEGER ::= 9
id-DL-GTP-PDU-SequenceNumber                    INTEGER ::= 10
id-EncryptionInformation                        INTEGER ::= 11
id-IntegrityProtectionInformation               INTEGER ::= 12
id-IuTransportAssociation                       INTEGER ::= 13
id-L3-Information                               INTEGER ::= 14
id-LAI                                          INTEGER ::= 15
id-NAS-PDU                                      INTEGER ::= 16
id-NonSearchingIndication                       INTEGER ::= 17
```

```
id-NumberOfSteps                                INTEGER ::= 18
id-OMC-ID                                       INTEGER ::= 19
id-OldBSS-ToNewBSS-Information                  INTEGER ::= 20
id-PagingAreaID                                 INTEGER ::= 21
id-PagingCause                                  INTEGER ::= 22
id-PermanentNAS-UE-ID                           INTEGER ::= 23
id-RAB-ContextItem                              INTEGER ::= 24
id-RAB-ContextList                              INTEGER ::= 25
id-RAB-DataForwardingItem                       INTEGER ::= 26
id-RAB-DataForwardingItem-SRNS-CtxReq           INTEGER ::= 27
id-RAB-DataForwardingList                       INTEGER ::= 28
id-RAB-DataForwardingList-SRNS-CtxReq           INTEGER ::= 29
id-RAB-DataVolumeReportItem                     INTEGER ::= 30
id-RAB-DataVolumeReportList                     INTEGER ::= 31
id-RAB-DataVolumeReportRequestItem              INTEGER ::= 32
id-RAB-DataVolumeReportRequestList              INTEGER ::= 33
id-RAB-FailedItem                               INTEGER ::= 34
id-RAB-FailedList                               INTEGER ::= 35
id-RAB-ID                                       INTEGER ::= 36
id-RAB-QueuedItem                               INTEGER ::= 37
id-RAB-QueuedList                               INTEGER ::= 38
id-RAB-ReleaseFailedList                        INTEGER ::= 39
id-RAB-ReleaseItem                              INTEGER ::= 40
id-RAB-ReleaseList                              INTEGER ::= 41
id-RAB-ReleasedItem                             INTEGER ::= 42
id-RAB-ReleasedList                             INTEGER ::= 43
id-RAB-ReleasedList-IuRelComp                   INTEGER ::= 44
id-RAB-RelocationReleaseItem                    INTEGER ::= 45
id-RAB-RelocationReleaseList                    INTEGER ::= 46
id-RAB-SetupItem-RelocReq                       INTEGER ::= 47
id-RAB-SetupItem-RelocReqAck                    INTEGER ::= 48
id-RAB-SetupList-RelocReq                       INTEGER ::= 49
id-RAB-SetupList-RelocReqAck                    INTEGER ::= 50
id-RAB-SetupOrModifiedItem                      INTEGER ::= 51
id-RAB-SetupOrModifiedList                      INTEGER ::= 52
id-RAB-SetupOrModifyItem                        INTEGER ::= 53
id-RAB-SetupOrModifyList                        INTEGER ::= 54
id-RAC                                          INTEGER ::= 55
id-RelocationType                               INTEGER ::= 56
id-RequestType                                  INTEGER ::= 57
id-SAI                                          INTEGER ::= 58
id-SAPI                                         INTEGER ::= 59
id-SourceID                                     INTEGER ::= 60
id-SourceRNC-ToTargetRNC-TransparentContainer   INTEGER ::= 61
id-TargetID                                     INTEGER ::= 62
id-TargetRNC-ToSourceRNC-TransparentContainer   INTEGER ::= 63
id-TemporaryUE-ID                               INTEGER ::= 64
id-TraceReference                               INTEGER ::= 65
id-TraceType                                    INTEGER ::= 66
id-TransportLayerAddress                        INTEGER ::= 67
id-TriggerID                                    INTEGER ::= 68
```

```
id-UE-ID                                        INTEGER ::= 69
id-UL-GTP-PDU-SequenceNumber                    INTEGER ::= 70
id-RAB-FailedtoReportItem                       INTEGER ::= 71
id-RAB-FailedtoReportList                       INTEGER ::= 72
id-KeyStatus                                    INTEGER ::= 75
id-DRX-CycleLengthCoefficient                   INTEGER ::= 76
id-IuSigConIdList                               INTEGER ::= 77
id-IuSigConIdItem                               INTEGER ::= 78
id-IuSigConId                                   INTEGER ::= 79
id-DirectTransferInformationItem-RANAP-RelocInf INTEGER ::= 80
id-DirectTransferInformationList-RANAP-RelocInf INTEGER ::= 81
id-RAB-ContextItem-RANAP-RelocInf               INTEGER ::= 82
id-RAB-ContextList-RANAP-RelocInf               INTEGER ::= 83
id-RAB-ContextFailedtoTransferItem              INTEGER ::= 84
id-RAB-ContextFailedtoTransferList              INTEGER ::= 85
id-GlobalRNC-ID                                 INTEGER ::= 86
id-RAB-ReleasedItem-IuRelComp                   INTEGER ::= 87

END
```

9.3.7 Container Definitions

```
-- **************************************************************
--
-- Container definitions
--
-- **************************************************************

RANAP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    Criticality,
    Presence,
    PrivateIE-ID,
    ProtocolExtensionID,
    ProtocolIE-ID
FROM RANAP-CommonDataTypes
```

```
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs
FROM RANAP-Constants;

-- **************************************************************
--
-- Class Definition for Protocol IEs
--
-- **************************************************************

RANAP-PROTOCOL-IES ::= CLASS {
    &id             ProtocolIE-ID                   UNIQUE,
    &criticality            Criticality,
    &Value,
    &presence           Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY         &criticality
    TYPE                &Value
    PRESENCE            &presence
}

-- **************************************************************
--
-- Class Definition for Protocol IEs
--
-- **************************************************************

RANAP-PROTOCOL-IES-PAIR ::= CLASS {
    &id             ProtocolIE-ID                   UNIQUE,
    &firstCriticality       Criticality,
    &FirstValue,
    &secondCriticality      Criticality,
    &SecondValue,
    &presence           Presence
}
WITH SYNTAX {
    ID              &id
    FIRST CRITICALITY       &firstCriticality
    FIRST TYPE          &FirstValue
    SECOND CRITICALITY      &secondCriticality
    SECOND TYPE         &SecondValue
    PRESENCE            &presence
}

-- **************************************************************
--
-- Class Definition for Protocol Extensions
--
```

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

RANAP-PROTOCOL-EXTENSION ::= CLASS {
    &id             ProtocolExtensionID                UNIQUE,
    &criticality            Criticality,
    &Extension,
    &presence       Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY         &criticality
    EXTENSION           &Extension
    PRESENCE        &presence
}

-- **************************************************************
--
-- Class Definition for Private IEs
--
-- **************************************************************

RANAP-PRIVATE-IES ::= CLASS {
    &id             PrivateIE-ID,
    &criticality            Criticality,
    &Value,
    &presence       Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY         &criticality
    TYPE            &Value
    PRESENCE        &presence
}

-- **************************************************************
--
-- Container for Protocol IEs
--
-- **************************************************************

ProtocolIE-Container {RANAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field {RANAP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
    id              RANAP-PROTOCOL-IES.&id              ({IEsSetParam}),
    criticality         RANAP-PROTOCOL-IES.&criticality         ({IEsSetParam}{@id}),
    value               RANAP-PROTOCOL-IES.&Value               ({IEsSetParam}{@id})
}

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

```
--
-- Container for Protocol IE Pairs
--
-- **************************************************************

ProtocolIE-ContainerPair {RANAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair {RANAP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {
    id              RANAP-PROTOCOL-IES-PAIR.&id         ({IEsSetParam}),
    firstCriticality        RANAP-PROTOCOL-IES-PAIR.&firstCriticality   ({IEsSetParam}{@id}),
    firstValue          RANAP-PROTOCOL-IES-PAIR.&FirstValue         ({IEsSetParam}{@id}),
    secondCriticality       RANAP-PROTOCOL-IES-PAIR.&secondCriticality  ({IEsSetParam}{@id}),
    secondValue         RANAP-PROTOCOL-IES-PAIR.&SecondValue            ({IEsSetParam}{@id})
}

-- **************************************************************
--
-- Container Lists for Protocol IE Containers
--
-- **************************************************************

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, RANAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
    ProtocolIE-Container {{IEsSetParam}}

ProtocolIE-ContainerPairList {INTEGER : lowerBound, INTEGER : upperBound, RANAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
    ProtocolIE-ContainerPair {{IEsSetParam}}

-- **************************************************************
--
-- Container for Protocol Extensions
--
-- **************************************************************

ProtocolExtensionContainer {RANAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
    SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField {RANAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
    id              RANAP-PROTOCOL-EXTENSION.&id            ({ExtensionSetParam}),
    criticality         RANAP-PROTOCOL-EXTENSION.&criticality       ({ExtensionSetParam}{@id}),
    extensionValue          RANAP-PROTOCOL-EXTENSION.&Extension     ({ExtensionSetParam}{@id})
}

-- **************************************************************
--
-- Container for Private IEs
--
```

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

PrivateIE-Container {RANAP-PRIVATE-IES : IEsSetParam } ::=
    SEQUENCE (SIZE (1.. maxPrivateIEs)) OF
    PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field {RANAP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
    id              RANAP-PRIVATE-IES.&id           ({IEsSetParam}),
    criticality         RANAP-PRIVATE-IES.&criticality      ({IEsSetParam}{@id}),
    value           RANAP-PRIVATE-IES.&Value        ({IEsSetParam}{@id})
}

END
```

9.4 Message Transfer Syntax

RANAP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax as specified in ref. [13].

9.5 Timers

$T_{RELOCprep}$

- Specifies the maximum time for Relocation Preparation procedure in the source RNC.

$T_{RELOCoverall}$

- Specifies the maximum time for the protection of overall Relocation procedure in the source RNC.

$T_{RELOCalloc}$

- Specifies the maximum time for Relocation Resource Allocation procedure in the CN.

$T_{RELOCcomplete}$

- Specifies the maximum time for waiting the relocation completion in the CN.

$T_{RABAssgt}$

- Specifies the maximum time in the CN for the whole RAB Assignment procedure.

$T_{QUEUING}$

- Specifies the maximum time in the RNC for queuing of the request of RAB establishment or modification.

$T_{DATAfwd}$

- Specifies the maximum time for GTP-PDU forwarding at the source RNC during relocation of SRNS.

T_{igOC}

- While this timer is running, all OVERLOAD messages or signalling point congested information received at the CN are ignored.

T_{igOR}

- While this timer is running, all OVERLOAD messages or signalling point congested information received at the RNC are ignored.

T_{inTC}

- While this timer is running, the CN is not allowed to increase traffic.

T_{inTR}

- While this timer is running, the RNC is not allowed to increase traffic.

T_{RafC}

- Specifies the maximum time for Reset procedure in the RNC.

T_{RatC}

- Specifies a guard period in the RNC before sending a RESET ACKNOWLEDGE message.

T_{RafR}

- Specifies the maximum time for Reset procedure in the CN.

T_{RatR}

- Specifies a guard period in the CN before sending a RESET ACKNOWLEDGE message.

10 Handling of Unknown, Unforeseen and Erroneous Protocol Data

10.1 General

Protocol Error cases can be divided into three classes:

- Transfer Syntax Error.
- Abstract Syntax Error.
- Logical Error.

Protocol errors can occur in the following functions within a receiving node:

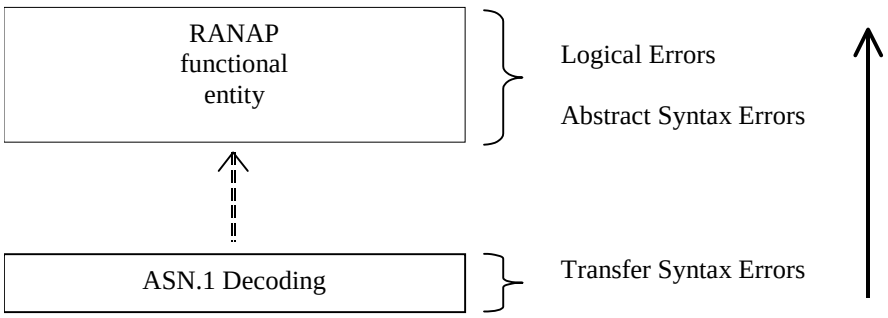

Figure 36: Protocol Errors in RANAP.

10.2 Transfer Syntax Error

A Transfer Syntax Error occurs when the receiver is not able to decode the received physical message. Transfer syntax errors are always detected in the process of ASN.1 decoding. If a Transfer Syntax Error occurs, the receiver should initiate Error Indication procedure with appropriate cause value for the Transfer Syntax protocol error.

Examples for Transfer Syntax Errors are:

- Violation of value ranges in ASN.1 definition of messages. e.g.: If an IE has a defined value range of 0 to 10 (ASN.1: INTEGER (0..10)), and 12 will be received, then this will be treated as a transfer syntax error.
- Violation in list element constraints. e.g.: If a list is defined as containing 1 to 10 elements, and 12 elements will be received, than this case will be handled as a transfer syntax error.
- Missing mandatory elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).
- Wrong order of elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

10.3 Abstract Syntax Error

10.3.1 General

An Abstract Syntax Error occurs when the receiving functional RANAP entity:

1. receives IEs or IE groups that cannot be understood (unknown IE ID);

2. receives IEs for which the logical range is violated (e.g.: ASN.1 definition: 0 to 15, the logical range is 0 to 10 (values 11 to 15 are undefined), and 12 will be received; this case will be handled as an abstract syntax error using criticality information sent by the originator of the message);

3. does not receive IEs or IE groups but according to the specified presence of the concerning object, the IEs or IE groups should have been present in the received message.

4. receives IEs or IE groups that are defined to be part of that message in wrong order or with too many occurrences of the same IE or IE group

Cases 1 and 2 (not comprehended IE/IE group) are handled based on received Criticality information. Case 3 (missing IE/IE group) is handled based on Criticality information and Presence information for the missing IE/IE group specified in the version of the specification used by the receiver. Case 4 (IEs or IE groups in wrong order or with too many occurrences) results in rejecting the procedure.

If an Abstract Syntax Error occurs, the receiver shall read the remaining message and shall then for each detected Abstract Syntax Error that belong to cases 1-3 act according to the Criticality Information and Presence Information for the IE/IE group due to which Abstract Syntax Error occurred in accordance with subclauses 10.3.4 and 10.3.5. The handling of case 4 is specified in subclause 10.3.6.

10.3.2 Criticality Information

In the RANAP messages there is criticality information set for individual IEs and/or IE groups. This criticality information instructs the receiver how to act when receiving an IE or an IE group that is not comprehended, i.e. the entire item (IE or IE group) which is not (fully or partially) comprehended shall be treated in accordance with its own criticality information as specified in chapter 10.3.4.

In addition, the criticality information is used in case of the missing IE/IE group abstract syntax error (see subclause 10.3.5).

The receiving node shall take different actions depending on the value of the Criticality Information. The three possible values of the Criticality Information for an IE/IE group are:

- Reject IE.

- Ignore IE and Notify Sender.

- Ignore IE.

The following rules restrict when a receiving entity may consider an IE, an IE group, or an EP not comprehended (not implemented), and when action based on criticality information is applicable:

1. IE or IE group: When one new or modified IE or IE group is implemented for one EP from a standard version, then other new or modified IEs or IE groups specified for that EP in that standard version shall be considered comprehended by a receiving entity (some may still remain unsupported).

   Note that this restriction is not applicable to a sending entity for constructing messages.

2. EP: The comprehension of different EPs within a standard version or between different standard versions is not mandated. Any EP that is not supported may be considered not comprehended, even if another EP from that standard version is comprehended, and action based on criticality shall be applied.

10.3.3 Presence Information

For many IEs/IE groups which are optional according to the ASN.1 transfer syntax, RANAP specifies separately if the presence of these IEs/IE groups is optional or mandatory with respect to RNS application by means of the presence field of the concerning object of class RANAP-PROTOCOL-IES, RANAP-PROTOCOL-IES-PAIR, RANAP-PROTOCOL-EXTENSION or RANAP-PRIVATE-IES.

The presence field of the indicated classes supports three values:

1. Optional;
2. Conditional;
3. Mandatory.

If an IE/IE group is not included in a received message and the presence of the IE/IE group is mandatory or the presence is conditional and the condition is true according to the version of the specification used by the receiver, an abstract syntax error occurs due to a missing IE/IE group.

10.3.4 Not comprehended IE/IE group

10.3.4.1 Procedure Code

The receiving node shall treat the different types of received criticality information of the *Procedure Code* IE according to the following:

Reject IE:

- If a message is received with a *Procedure Code* IE marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall reject the procedure using the Error Indication procedure.

Ignore IE and Notify Sender:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the procedure and initiate the Error Indication procedure.

Ignore IE:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the procedure.

When using the Error Indication procedure to reject a procedure or to report an ignored procedure it shall include the *Procedure Code* IE, the *Triggering Message* IE, and the *Procedure Criticality* IE in the *Criticality Diagnostics* IE.

10.3.4.2 IEs other than the Procedure Code

The receiving node shall treat the different types of received criticality information of an IEs/IE group other than the *Procedure Code* IE according to the following:

Reject IE:

- If a message *initiating* a procedure is received containing one or more IEs/IE group marked with "*Reject IE*" which the receiving node does not comprehend; none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the rejection of one or more IEs/IE group using the message normally used to report unsuccessful outcome of the procedure.

- If a message *initiating* a procedure that does not have a message to report unsuccessful outcome is received containing one or more IEs/IE groups marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall initiate the Error Indication procedure.

- If a *response* message is received containing one or more IEs marked with "*Reject IE*", that the receiving node does not comprehend, the receiving node shall initiate local error handling.

Ignore IE and Notify Sender:

- If a message *initiating* a procedure is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups, continue with the procedure as if the not comprehended IEs/IE groups were not received (except for the reporting) using the understood IEs/IE groups, and report in the response message of the procedure that one or more IEs/IE groups have been ignored.

- if a message *initiating* a procedure that does not have a message to report the outcome of the procedure is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups, continue with the procedure as if the not comprehended IEs/IE groups were not received (except for the reporting) using the understood IEs/IE groups, and initiate the Error Indication procedure to report that one or more IEs/IE groups have been ignored.

- If a *response* message is received containing one or more IEs/IE groups marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups and initiate the Error Indication procedure.

Ignore IE:

- If a message *initiating* a procedure is received containing one or more IEs/IE groups marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the content of the not comprehended IEs/IE groups and continue with the procedure as if the not comprehended IEs/IE groups were not received using the understood IEs/IE groups.

When reporting not comprehended IEs/IE groups marked with "*Reject IE*" or "*Ignore IE and Notify Sender*" using a response message defined for the procedure, the *Information Element Criticality Diagnostics* IE shall be included in the *Criticality Diagnostics* IE for each reported IE/IE group. The *Repetition Number* IE shall be included in the *Information Element Criticality Diagnostics* IE if the reported IE/IE group was part of a "SEQUENCE OF" definition.

When reporting not comprehended IEs/IE groups marked with "*Reject IE*" or "*Ignore IE and Notify Sender*" using the Error Indication procedure, the *Procedure Code* IE, the *Triggering Message* IE, *Procedure Criticality* IE, and the *Information Element Criticality Diagnostics* IE shall be included in the *Criticality Diagnostics* IE for each reported IE/IE group. The *Repetition Number* IE shall be included in the *Information Element Criticality Diagnostics* IE if the reported IE/IE group was part of a "SEQUENCE OF" definition.

10.3.5 Missing IE or IE group

The receiving node shall treat the missing IE/IE group according to the criticality information for the missing IE/IE group in the received message specified in the version of this specification used by the receiver:

Reject IE:

- if a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Reject IE*"; none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the missing IEs/IE groups using the message normally used to report unsuccessful outcome of the procedure.

- if a received message *initiating* a procedure that does not have a message to report unsuccessful outcome is missing one or more IEs/IE groups with specified criticality "*Reject IE*", the receiving node shall initiate the Error Indication procedure.

- if a received *response* message is missing one or more IEs/IE groups with specified criticality "*Reject IE*, the receiving node shall initiate local error handling.

Ignore IE and Notify Sender:

- if a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall continue with the procedure based on the other IEs/IE groups present in the message and report in the response message of the procedure that one or more IEs/IE groups were missing.

- if a received message *initiating* a procedure that does not have a message to report the outcome of the procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall continue with the procedure based on the other IEs/IE groups present in the message and initiate the Error Indication procedure to report that one or more IEs/IE groups were missing.

- if a received *response* message is missing one or more IEs/IE groups with specified criticality "*Ignore IE and Notify Sender*", the receiving node shall initiate the Error Indication procedure.

Ignore IE:

- if a received message *initiating* a procedure is missing one or more IEs/IE groups with specified criticality "*Ignore IE*", the receiving node shall continue with the procedure based on the other IEs/IE groups present in the message.

When reporting missing IEs/IE groups with specified criticality "*Reject IE*" or "*Ignore IE and Notify Sender*" using a response message defined for the procedure, the *Information Element Criticality Diagnostics* IE shall be included in the *Criticality Diagnostics* IE for each reported IE/IE group.

When reporting missing IEs/IE groups with specified criticality "*Reject IE*" or "*Ignore IE and Notify Sender*" using the Error Indication procedure, the *Procedure Code* IE, the *Triggering Message* IE, *Procedure Criticality* IE, and the *Information Element Criticality Diagnostics* IE shall be included in the *Criticality Diagnostics* IE for each reported IE/IE group.

10.3.6 IEs or IE groups received in wrong order or with too many occurrences

If a message with IEs or IE groups in wrong order or with too many occurrences is received, the receiving node shall behave according to the following:

- If a message *initiating* a procedure is received containing IEs or IE groups in wrong order or with too many occurrences, none of the functional requests of the message shall be executed. The receiving node shall reject the procedure and report the cause value "Abstract Syntax Error (Falsely Constructed Message)" using the message normally used to report unsuccessful outcome of the procedure.

- If a message *initiating* a procedure that does not have a message to report unsuccessful outcome is received containing IEs or IE groups in wrong order or with too many occurrences, the receiving node shall initiate the Error Indication procedure, and use cause value "Abstract Syntax Error (Falsely Constructed Message)".

- If a *response* message is received containing IEs or IE groups in wrong order or with too many occurrences, the receiving node shall initiate local error handling.

10.4 Logical Error

Logical error situations occur when a message is comprehended correctly, but the information contained within the message is not valid (i.e. semantic error), or describes a procedure which is not compatible with the state of the receiver. In these conditions, the following behaviour shall be performed (unless otherwise specified) as defined by the class of the elementary procedure, irrespective of the criticality information of the IEs/IE groups containing the erroneous values.

Class 1:

Where the logical error occurs in a request message of a class 1 procedure, and the procedure has a failure message, the failure message shall be sent with an appropriate cause value. Typical cause values are:

- Semantic Error.

- Message not compatible with receiver state.

Where the logical error is contained in a request message of a class 1 procedure, and the procedure does not have a failure message, the Error Indication procedure shall be initiated with an appropriate cause value.

Where the logical error exists in a response message of a class 1 procedure, local error handling shall be initiated.

Class 2:

Where the logical error occurs in a message of a class 2 procedure, the Error Indication procedure shall be initiated with an appropriate cause value.

Class 3:

Where the logical error occurs in a request message of a class 3 procedure, and the procedure has a failure message, the failure message shall be sent with an appropriate cause value. Typical cause values are:

- Semantic Error.
- Message not compatible with receiver state.

Where the logical error is contained in a request message of a class 3 procedure, and the procedure does not have a failure message, the Error Indication procedure shall be initiated with an appropriate cause value.

Where the logical error exists in a response message of a class 3 procedure, local error handling shall be initiated.

11 Special Procedures for RNC to RNC Communication

11.1 General

This subclause specifies special procedures that are used for RNC to RNC communication, and use other transport means than the RANAP procedures specified in clause 8.

11.2 RANAP Relocation Information

11.2.1 General

The purpose of the RANAP Relocation Information procedure is to handle the RANAP related information that is carried transparently during relocation from source RNC to target RNC by RNSAP via Iur Interface.

11.2.2 Operation

When during relocation it becomes necessary in the source RNC to generate RANAP information for transfer to the relocation target, the RNC shall form a RANAP RELOCATION INFORMATION message. The message shall be encoded according to the encoding rules specified for RANAP in the similar manner as for the normal RANAP messages. The outcome of the encoding will be an octet string, which shall not be sent to the CN via the Iu Interface, but it shall be given to the appropriate local process for transparent transfer to the target RNC.

When the RANAP process in the target RNC receives an octet string containing RANAP RELOCATION INFORMATION message that had been transparently transferred from the source RNC, it shall decode it according to the encoding rules specified for RANAP. This process is similar to receiving any normal RANAP message. The decoded information shall be passed to the appropriate processes in the RNC.

Annex A (informative)
RANAP Guidelines

A.1 Rules for building RANAP messages

A.1.1 Rules for RANAP messages that shall contain the CN Domain Indicator IE

Based on the principles described in [3], following rules can be deduced:

1) Any RANAP message initiating a connection oriented signalling connection shall contain the *CN Domain Indicator* IE. For the time being, two such RANAP messages are known: INITIAL UE MESSAGE message and RELOCATION REQUEST message.

2) Any RANAP message belonging to class 1 procedures that uses connectionless signalling shall contain the *CN Domain Indicator* IE.

3) Following RANAP message belonging to class 2 procedures that uses connectionless signalling shall contain the *CN Domain Indicator* IE: PAGING message and ERROR INDICATION message.

Annex B (informative): Change history

Change history					
TSG RAN#	Version	CR	Tdoc RAN	New Version	Subject/Comment
RAN_06	-	-	RP-99746	3.0.0	Approved at TSG RAN #6 and placed under Change Control
RAN_07	3.0.0	-	-	3.1.0	Approved at TSG RAN #7
RAN_08	3.1.0	-	-	3.2.0	Approved at TSG RAN #8
RAN_09	3.2.0	124-136, 138, 168-171, 173, 174	RP-000373	3.3.0	Approved at TSG RAN #9
RAN_09	3.2.0	175, 177-179, 181-184	RP-000374	3.3.0	Approved at TSG RAN #9
RAN_10	3.3.0	185-191, 194-199, 201, 203-207, 210-214, 219, 221-232, 234, 235	RP-000613 RP-000695	3.4.0	Approved at TSG RAN #10

History

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V3.0.0	January 2000	Publication
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V3.3.0	September 2000	Publication
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