TSG RAN Meeting #17 **RP-020629**
Biarritz, France, 3 - 6 September, 2002

Title **Single CRs (Rel-5 only) for different topics, each CR linked to other TSGs than TSG RAN**
Source **TSG RAN WG3**
Agenda Item **7.3.5**

RAN3 Tdoc	Spec	curr. Vers.	new Vers.	REL	CR	Rev	Cat	Title	Work item
R3-022069	25.413	5.1.0	5.2.0	REL-5	488	1	F	CRRM Corrections	TEI5
R3-022101	25.413	5.1.0	5.2.0	REL-5	514	-	B	One possible invisible implementation for UTRAN pure systems of GERAN specific LCS change in RANAP	LCS-GERAN
R3-022096	25.414	5.1.0	5.2.0	REL-5	039	3	F	Necessary changes for the Iu UP support mode on Iu-cs for the IP transport option	ETRAN-IPtrans

Note: R3-022069 and R3-022101 with links to TSG GERAN, R3-022096 with links to TSG CN.

3GPP TSG-RAN3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc ⌘R3-022069

CR-Form-v7

CHANGE REQUEST

⌘ **25.413** **CR** **488** ⌘ **rev** **1** ⌘ Current version: **5.1.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	CRRM Corrections
Source:	⌘	RAN WG3
Work item code:	⌘	TEI5
Date:	⌘	19/08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change: ⌘ During inter-system handover, it is not defined whether the load to be reported by the RNC should take into account the load variation caused by the handover in progress.

Where *New BSS to Old BSS Information* and *Old BSS to New BSS Information* IEs are included in various Relocation messages, explicit explanation of whether the cell load information is related to the handover in question is not stated.

Summary of change: ⌘ Specification that the load reported by the RNC does not take into consideration the ongoing inter-system handover, with the exception of the target RNC when the Relocation Resource Allocation procedure is successfully completed, the load given in the target cell assumes the successful completion of the inter-system handover.

Impact assessment towards the previous version of the specification (same release):

This CR has isolated impact towards the previous version of the specification (same release).

This CR has an impact under functional point of view.

The impact can be considered isolated because it only affects the procedures Relocation Preparation and Relocation Resource Allocation.

Consequences if ⌘ Ambiguous definition of the value reported by the new BSS. Different

not approved:	implementations of the procedure will lead to a BSC/RNC storing a load value for a cell in another BSC/RNC *different* from the actual load. This, especially in small cells, will lead to: • If the load is interpreted to be higher than it actually is, radio spectrum not being fully utilised in the reported cell; • if the load is interpreted to be lower than it actually is, failed handover procedures towards the reported cell may result.

Clauses affected:	⌘	8.6.2, 8.7.2, 8.7.3			
Other specs affected:	⌘	Y: X Y: Y:	N: N: X N: X	Other core specifications Test specifications O&M Specifications	⌘ TS 48.008
Other comments:	⌘				

How to create CRs using this form:
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8.6 Relocation Preparation

8.6.2 Successful Operation

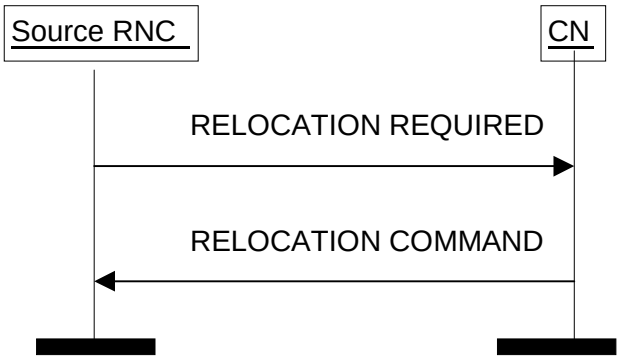

Figure 1: Relocation Preparation procedure. Successful operation.

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 handover. 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 handover 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", "Reduce Load in Serving Cell".

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 in relocation of SRNS " or "UE not involved in relocation of SRNS ".

In case of intra-system Relocation, the source RNC shall include in the RELOCATION REQUIRED message the *Source RNC to Target RNC Transparent Container* IE. This container shall include the *Relocation Type* IE and the number of Iu signalling connections existing for the UE by setting correctly the *Number of Iu Instances* IE . If available, this container shall further include the *Chosen Integrity Protection Algorithm* IE and the *Integrity Protection Key* IE. If ciphering is active, this container shall include, for ciphering information of signalling data, the *Chosen Encryption Algorithm* IE and the *Ciphering Key* IE, for ciphering information of CS user data the *Chosen Encryption Algorithm CS* IE and for ciphering information of PS user data the *Chosen Encryption Algorithm PS* IE. This container shall include the *RRC Container* IE. If 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 *Source RNC to Target RNC Transparent Container* IE shall include the mapping between each RAB subflow and transport channel identifier(s), i.e. if 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. If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS", the *d-RNTI* IE shall be included in the *Source RNC to Target RNC Transparent Container* IE. If the *Relocation Type* IE is set to "UE involved in relocation of SRNS", the *Target Cell ID* IE shall be included in the *Source RNC to Target RNC Transparent Container* IE.

In case of inter-system 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.

- shall include the *Old BSS to New BSS Information* IE within the RELOCATION REQUIRED message only if the information is available. This information shall include, if available, the current traffic load in the source cell, i.e. prior to the inter-system handover attempt.

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 $T_{RELOCcomplete}$.

If the *Target RNC To Source RNC Transparent Container* IE or the *L3 information* IE is received by the CN from the relocation target, it shall be included in the RELOCATION COMMAND message.

The RELOCATION COMMAND message may also contain the *Inter-System Information Transparent Container* IE.

For each RAB successfully established in the target system and originating from the PS domain, the RELOCATION COMMAND message shall contain at least one pair of Iu transport address and Iu transport association to be used for the forwarding of the DL N-PDU duplicates towards the relocation target. If more than one pair of Iu transport address and Iu transport association is included, the source RNC shall select one of the pairs 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 the target system (including target CN) 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. This list is contained in the *RABs to Be Released* IE. The source RNC shall use this information to avoid transferring associated contexts where applicable and may use this information e.g. to decide if to cancel the relocation or not. 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.

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.

8.7 Relocation Resource Allocation

8.7.2 Successful Operation

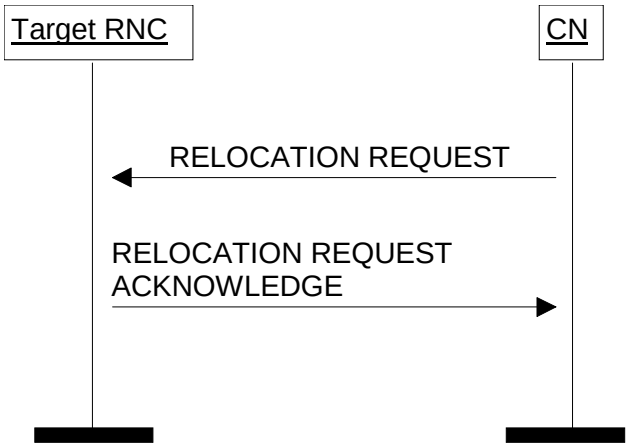

Figure 2: Relocation Resource Allocation procedure. Successful operation.

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 may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

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

When a RELOCATION REQUEST message is sent from a CN node towards an RNC for which the sending CN node is not the default CN node, the *Global CN-ID* IE shall be included.

Upon reception of the RELOCATION REQUEST message, the target RNC shall initiate allocation of requested resources.

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)
- *Cause*
- *CN Domain Indicator*
- *Source RNC To Target RNC Transparent Container*
- *Iu Signalling Connection Identifier*
- *Integrity Protection Information* IE (if available)

For each RAB requested to relocate (or to be created e.g. in the case of inter-system handover), the message shall contain following IEs:

- *RAB-ID*
- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)
- *RAB parameters*
- *User Plane Information*
- *Transport Layer Address*
- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)
- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information* (shall not be included if the *Integrity Protection Information* IE is not included)

For each RAB requested to relocate the message may include following IEs:

- *Service Handover*.
- *Alternative RAB Parameter Values*.

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 Information*(i.e. required User Plane Mode and required User Plane Versions)
- *Priority level, queuing and pre-emption indication*
- *Service Handover*

The *SDU Format Information Parameter* IE in the *RAB Parameters* IE shall be present only if the *User Plane Mode* IE is set to “support mode for pre-defined SDU sizes” and the *Traffic Class* IE is set to either “Conversational” or “Streaming”.

If the RELOCATION REQUEST message includes the *PDP Type Information* IE, the UTRAN may use this IE 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.

The algorithms within the *Integrity Protection Information* IE and the *Encryption Information* IE shall be ordered in preferred order with the most preferred first in the list.

The *Permitted Encryption Algorithms* IE within the *Encryption Information IE* may contain “no encryption” within an element of its list in order to allow the RNC not to cipher the respective connection. This can be done either by not starting ciphering or by using the UEA0 algorithm. In the absence of the *Encryption Information* IE, the RNC shall not start ciphering.

The *Global CN-ID* IE contains the identity of the CN node that sent the RELOCATION REQUEST message, and it shall, if included, be stored together with the Iu signalling connection identifier. If the *Global CN-ID* IE is not included, the RELOCATION REQUEST message shall be considered as coming from the default CN node for the indicated CN domain.

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

If the *Relocation Type* IE is set to "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 any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE.

If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS":

- The target RNC may accept a RAB only if the radio bearer(s) for the RAB either exist(s) already, and can be used for the RAB by the target RNC, or does not exist before the relocation but can be established in order to support the RAB in 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.

- If any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE. It should be noted that the usage of alternative RAB parameter values is not applicable to the UTRAN initiated relocation of type "UE not involved in 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.

For each RAB successfully setup the RNC shall include following IEs:

- *RAB ID*

- *Transport Layer Address* (when no ALCAP has been used)

- *Iu Transport Association* (when no ALCAP has been used)

Two pairs of *Transport Layer Address* IE and *Iu Transport Association* IE may be included for RABs established towards the PS domain.

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. 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 sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the target RNC supports cell load-based inter-system handover, then in the case of inter-system handover, the *New BSS to Old BSS Information* IE may be included in the RELOCATION REQUEST ACKNOWLEDGE message. This information shall include, if available, the current traffic load in the target cell assuming a successful completion of the handover in progress.

If the *Integrity Protection Information* IE was included in the RELOCATION REQUEST message, the RNC shall include the *Chosen Integrity Protection Algorithm* IE within the RELOCATION REQUEST ACKNOWLEDGE message, if the *Encryption Information* IE was included, the RNC shall include the *Chosen Encryption Algorithm* IE.

If one or more of the RABs that the target RNC has decided to support can not be supported by the CN, then these failed RABs shall not be released towards the target RNC until the relocation is completed.

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.

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise

the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".

8.7.3 Unsuccessful Operation

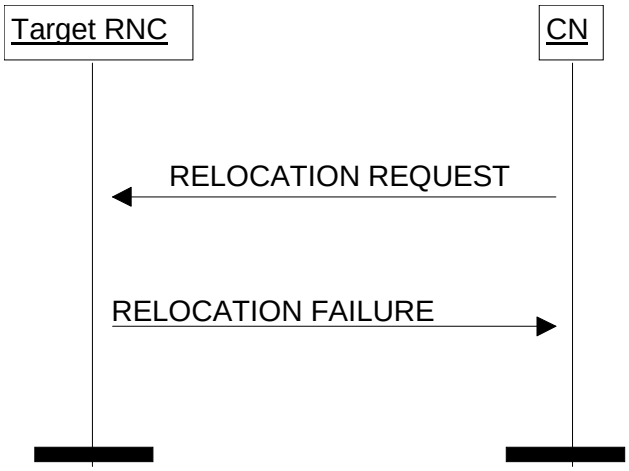

Figure 3: Relocation Resource Allocation procedure: Unsuccessful operation.

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.

In the case of inter-system handover, and if the target RNC supports cell load-based inter-system handover, then

- the *NewBSS to Old BSS Information* IE may be included in the RELOCATION FAILURE message. This information shall include, if available, the current traffic load in the target cell.
- the RELOCATION FAILURE message may contain the appropriate value in the *Cause* IE, e.g. "No Radio Resources Available in Target Cell".

3GPP TSG-RAN3 Meeting #31
Arlanda, Sweden, 19th – 23rd August 2002

Tdoc R3-022101

CR-Form-v7

CHANGE REQUEST

⌘ **25.413** **CR** **514** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☒

Title: ⌘	One possible invisible implementation for UTRAN pure systems of GERAN specific LCS change in RANAP	
Source: ⌘	RAN WG3	
Work item code: ⌘	LCS-GERAN	***Date:*** ⌘ 22/08/2002
Category: ⌘	**B**	***Release:*** ⌘ Rel-5

Use one of the following categories:
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R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change: ⌘ According to the LS from GERAN WG2 [R3-013183], GERAN Iu Mode LCS uses Iu RANAP Procedures. Some enhancements to RANAP are required in order to support GERAN Iu Mode LCS.

Summary of change: ⌘ In review of 25.413 v4.2.0, TSG GERAN WG2 has identified 3 places where enhancements to the existing RANAP signaling are required so that RANAP will support GERAN Iu mode LCS:

1. The Location Related Data Request message should allow the CN to request Dedicated Mobile-Assisted E-OTD Assistance Data and Dedicated Mobile-Based E-OTD Assistance Data be delivered to the mobile station, and also allow the CN to request that Deciphering Keys for E-OTD be delivered to the CN.
2. The Client Type IE in the Request Type Element of the Location Reporting Control message should allow additional Client Types to be specified (PLMN Operator - broadcast services, PLMN Operator - O&M, PLMN Operator - anonymous statistics, PLMN Operator - Target MS service support). These Client Types are supported in GERAN A/Gb mode LCS, and are needed in GERAN Iu mode LCS.
3. The Cause IE in the Location Report message should allow the RAN to return an indication of Congestion.

However no restriction was foreseen to be added for GERAN request of bullet 2 and 3, as those new LCS client types and that indication of Congestion can also apply in UTRAN case according to actual LCS stage 1 and 2 specifications [TS 22.071]/[TS 23.271].

Therefore this CR is aiming to address only the GERAN Iu mode Specific changes i.e. the bullet 1.
Furthermore taken ARIB/TTC concerns into account, the new values specific to GERAN Iu mode are introduced in a totally new procedure that is specific to GERAN Iu mode and based on the same structure as the current Location Related Data procedure.

		Impact Analysis: Impact assessment towards the previous version of the specification (previous release): This CR has no impact with the previous version of the specification (previous release) because this is an optional new feature and the ASN.1 changes are made by adding a new specific procedure.
Consequences if not approved:	⌘	

Clauses affected:	⌘	7, 8.1, 8.1.1(new), 8.31.2, 8.31.3, 8.32(new), 9.1.50(new), 9.1.51(new), 9.1.52(new), 9.2.1.1, 9.2.3.23(new), 9.2.3.24(new), 9.2.3.25(new), 9.3.2, 9.3.3, 9.3.4 and 9.3.6

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	GERAN stage 2 ?
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

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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 change 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 (see [8]). This function has two 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.
- Location related data. This function allows the CN to either retrieve from the RNC deciphering keys (to be forwarded to the UE) for the broadcasted assistance data, or request the RNC to deliver dedicated assistance data to the UE.

- Location related data for GERAN Iu mode. This function allows the CN to either retrieve from the BSS deciphering keys (to be forwarded to the UE) for the broadcasted assistance data, or request the BSS to deliver dedicated assistance data to the UE.

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	
Location related Data	LOCATION RELATED DATA REQUEST	LOCATION RELATED DATA RESPONSE	LOCATION RELATED DATA FAILURE
Location related Data for GERAN Iu mode	LOCATION RELATED DATA REQUEST FOR GERAN IU MODE	LOCATION RELATED DATA RESPONSE FOR GERAN IU MODE	LOCATION RELATED DATA FAILURE FOR GERAN IU MODE

Table 2: Class 2

Elementary Procedure	Message
RAB Modification Request	RAB MODIFY REQUEST
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.

8.1.1 RANAP functions and elementary procedures for GERAN Iu mode

The functions and RANAP elementary procedures, which are only applicable for GERAN Iu mode are shown in the Table 3a.

Table 3a: RANAP elementary procedures only applicable for GERAN Iu mode

Function	Elementary Procedure(s)
Location related data for GERAN Iu mode	Location related Data for GERAN Iu mode

The functions and RANAP elementary procedures, which are not applicable for GERAN Iu mode are shown in the Table 3b.

Table 3b: RANAP elementary procedures not applicable for GERAN Iu mode

Function	Elementary Procedure(s)
Location related data	Location related data

Note: all the other functions and related elementary procedures that are not mentioned in the table 3a and table 3b are applicable for both GERAN Iu mode and UTRAN. For those functions and related elementary procedures the term RNC shall refer to RNC/BSS.

8.2 RAB Assignment

Lots of unaffected part in 8.2 not shown

8.31 Location Related Data

8.31.1 General

The purpose of the Location Related Data procedure is to provide the means to handle additional Location related requests over the Iu interface: it allows the CN to either retrieve from the RNC deciphering keys (to be forwarded to the UE) for the broadcasted assistance data, or request the RNC to deliver dedicated assistance data to the UE.

8.31.2 Successful Operation

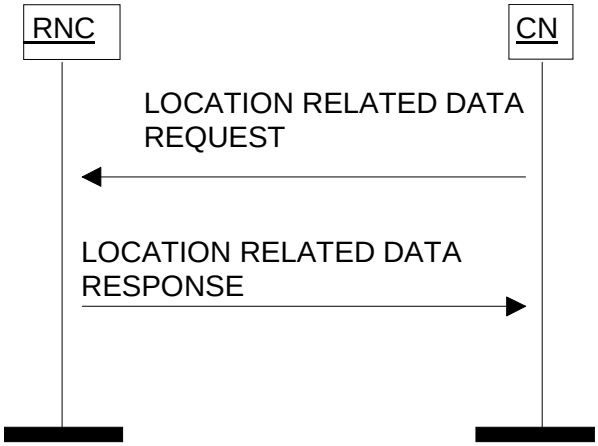

Figure 3~~6~~7~~A~~: Location Related Data procedure. Successful operation.

The CN initiates the procedure by generating an LOCATION RELATED DATA REQUEST message to the RNC.

Upon the reception of the LOCATION RELATED DATA REQUEST message, the RNC shall initiate requested function as indicated in the *Location Related Data Request Type* IE.

The *Location Related Data Request Type* IE shall indicate to the RNC whether:

- to start dedicated assistance data delivery to the UE, or
- to send deciphering keys for broadcast assistance data to the CN.

If the LOCATION RELATED DATA REQUEST message included a request for dedicated assistance data delivery to the UE, and if the dedicated assistance data was successfully delivered to the UE, the RNC shall respond to CN with LOCATION RELATED DATA RESPONSE message containing no data.

If the LOCATION RELATED DATA REQUEST message included a request for broadcast assistance data deciphering keys, the RNC shall respond to CN with LOCATION RELATED DATA RESPONSE message containing the *Broadcast Assistance Data Deciphering Keys* IE.

8.31.3 Unsuccessful Operation

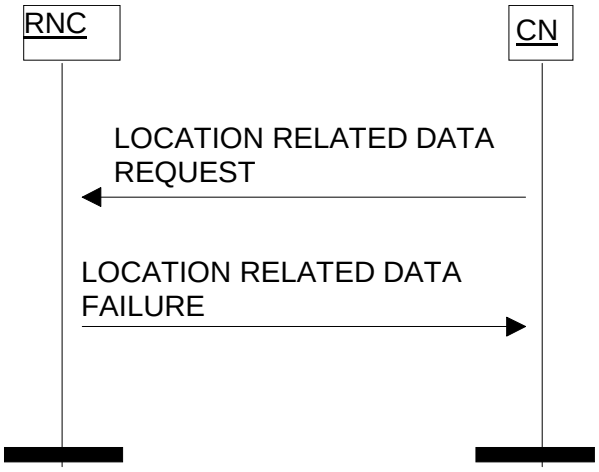

Figure ~~37~~38: Location Related Data procedure. Unsuccessful operation.

If the RNC was not able to successfully deliver the requested dedicated assistance data to the UE, or if the RNC is not able to provide the requested deciphering keys, the RNC shall send LOCATION RELATED DATA FAILURE message including *Cause* IE to the CN. The *Cause* IE shall indicate the appropriate cause value to CN, e.g. "Dedicated Assistance data Not Available" or "Deciphering Keys Not Available".

8.31.4 Abnormal Conditions

Not applicable.

8.32 Location Related Data for GERAN Iu mode

8.32.1 General

The purpose of the Location Related Data for GERAN Iu mode procedure is to provide the means to handle additional Location related requests over the Iu interface: it allows the CN to either retrieve from the BSS deciphering keys (to be forwarded to the UE) for the broadcasted assistance data, or request the BSS to deliver dedicated assistance data to the UE.

8.32.2 Successful Operation

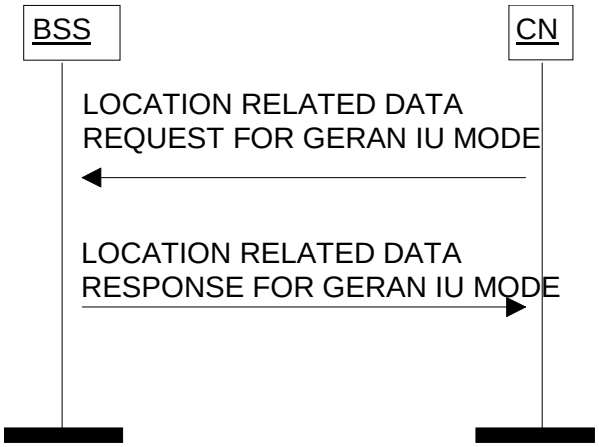

Figure 39: Location Related Data for GERAN Iu mode procedure. Successful operation.

The CN initiates the procedure by generating an LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message to the BSS.

Upon the reception of the LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message, the BSS shall initiate requested function as indicated in the *Location Related Data Request Type for GERAN Iu mode* IE.

The *Location Related Data Request Type for GERAN Iu mode* IE shall indicate to the BSS whether:

- to start dedicated assistance data delivery to the UE, or
- to send deciphering keys for broadcast assistance data to the CN.

If the LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message included a request for dedicated assistance data delivery to the UE, and if the dedicated assistance data was successfully delivered to the UE, the BSS shall respond to CN with LOCATION RELATED DATA RESPONSE FOR GERAN IU MODE message containing no data.

If the LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message included a request for broadcast assistance data deciphering keys, the BSS shall respond to CN with LOCATION RELATED DATA RESPONSE FOR GERAN IU MODE message containing the *Broadcast Assistance Data Deciphering Keys for GERAN Iu mode* IE.

8.32.3 Unsuccessful Operation

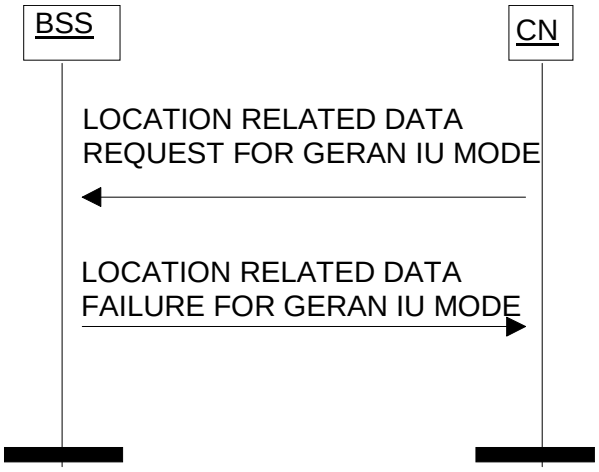

Figure 40: Location Related Data for GERAN Iu mode procedure. Unsuccessful operation.

If the BSS was not able to successfully deliver the requested dedicated assistance data to the UE, or if the BSS is not able to provide the requested deciphering keys, the BSS shall send LOCATION RELATED DATA FAILURE FOR GERAN IU MODE message including *Cause* IE to the CN. The *Cause* IE shall indicate the appropriate cause value to CN, e.g. "Dedicated Assistance data Not Available" or "Deciphering Keys Not Available".

8.32.4 Abnormal Conditions

Not applicable.

9 Elements for RANAP Communication

```
Lots of unaffected part in 9 not shown
```

9.1.47 LOCATION RELATED DATA REQUEST

This message is sent by the CN either to initiate delivery of dedicated assistance data from the RNC to the UE, or to retrieve deciphering keys for the broadcasted assistance data.

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	reject
Location Related Data Request Type	M		9.2.3.19		YES	reject

9.1.48 LOCATION RELATED DATA RESPONSE

This message is sent by the RNC to report the successful response of the LOCATION RELATED DATA 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	reject
Broadcast Assistance Data Deciphering Keys	O		9.2.3.20		YES	ignore

9.1.49 LOCATION RELATED DATA FAILURE

This message is sent by the RNC to report the unsuccessful response of the LOCATION RELATED DATA 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	reject
Cause	M		9.2.1.4		YES	ignore

9.1.50 LOCATION RELATED DATA REQUEST FOR GERAN IU MODE

This message is sent by the CN either to initiate delivery of dedicated assistance data from the BSS to the UE, or to retrieve deciphering keys for the broadcasted assistance data.

Direction: CN → BSS.

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	reject
Location Related Data Request Type for GERAN Iu mode	M		9.2.3.23		YES	reject

9.1.51 LOCATION RELATED DATA RESPONSE FOR GERAN IU MODE

This message is sent by the BSS to report the successful response of the LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message.

Direction: BSS → 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	reject
Broadcast Assistance Data Deciphering Keys for GERAN Iu mode	O		9.2.3.24		YES	ignore

9.1.52 LOCATION RELATED DATA FAILURE FOR GERAN IU MODE

This message is sent by the BSS to report the unsuccessful response of the LOCATION RELATED DATA REQUEST FOR GERAN IU MODE message.

Direction: BSS → 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	reject
Cause	M		9.2.1.4		YES	ignore

9.2 Information Element Definitions

9.2.0 General

Subclause 9.2 presents the RANAP IE definitions in tabular format. The corresponding ASN.1 definition is presented in subclause 9.3. In case there is contradiction between the tabular format in subclause 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.

When specifying information elements which are to be represented by bitstrings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);
- The last bit (rightmost bit) contains the least significant bit (LSB);
- When importing bitstrings from other specifications, the first bit of the bitstring contains the first bit of the concerned information;

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		(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, …, RAB Modify Request, Location Related Data, Location Related Data for GERAN Iu mode)	
>Type of Message	M		CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, Outcome, …)	

Lots of unaffected part in 9.2 not shown

9.2.3 NAS Related IEs

Lots of unaffected part in 9.2 not shown

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)	

9.2.3.19 Location Related Data Request Type

This element indicates the type of the requested location related data for the indicated positioning method, and provides the assistance data for the Assisted GPS positioning method.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Location Related Data Request Type				
>Requested Location Related Data Type	M		ENUMERATED(Deciphering Keys for UE Based OTDOA, Deciphering Keys for Assisted GPS, Dedicated Assistance Data for UE Based OTDOA, Dedicated Assistance Data for_Assisted GPS, ...)	
>Requested GPS Assistance Data	C – ifDedAssGPS		9.2.3.21	

Condition	Explanation
ifDedAssGPS	This IE shall be present if the *Requested Location Related Data Type* IE is set to 'Dedicated Assistance Data for Assisted GPS'.

9.2.3.20 Broadcast Assistance Data Deciphering keys

This information element is used for indicating the deciphering keys that will be used by the UE for deciphering of assistance data broadcast.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Broadcast Assistance Data Deciphering keys				
> Ciphering Key Flag	M		BIT STRING (SIZE(1))	Indicates the current Ciphering Key Flag that is used for the assistance data broadcast messages in the location area.
>Current Deciphering key	M		BIT STRING (SIZE(56))	Current deciphering key that is used for deciphering assistance data.
>Next Deciphering key	M		BIT STRING (SIZE(56))	Next deciphering key that will used for deciphering assistance data.

9.2.3.21 Requested GPS Assistance Data

This information element is used for indicating the requested GPS assistance data.

This IE is transparent to CN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Requested GPS Assistance Data			OCTET STRING (SIZE(1..38))	For the corresponding Information Element Definition see “gpsAssistanceData” [22].

9.2.3.22 Last Known Service Area

This information element is used for indicating the last known Service Area and the elapsed time since the UE was known to be in this Service Area. The last known Service Area is reported when the current Service Area is unknown to the RNC.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Last Known Service Area				
>SAI	M		9.2.3.9	
>Age of SAI	M		INTEGER (0..32767)	The value represents the elapsed time in minutes since the reported last known SAI was stored by the RNC. Value “0” shall not be used. Value “32767” indicates that the age of SAI is at least 32767 minutes old.

9.2.3.23 Location Related Data Request Type for GERAN Iu mode

This element indicates the type of the requested location related data for the indicated positioning method, and provides the assistance data for the Assisted GPS positioning method.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Location Related Data Request Type for GERAN Iu mode				
>Requested Location Related Data Type for GERAN Iu mode	M		ENUMERATED(Deciphering Keys for E-OTD, Deciphering Keys for Assisted GPS, Dedicated Mobile-Based E-OTD Assistance Data, Dedicated Assistance Data for Assisted GPS, Dedicated Mobile-Assisted E-OTD Assistance Data, ...)	
>Requested GPS Assistance Data for GERAN Iu mode	C – ifDedAssGPS		9.2.3.25	

Condition	Explanation
ifDedAssGPS	This IE shall be present if the *Requested Location Related Data Type for GERAN Iu mode* IE is set to 'Dedicated Assistance Data for Assisted GPS'.

9.2.3.24 Broadcast Assistance Data Deciphering keys for GERAN Iu mode

This information element is used for indicating the deciphering keys that will be used by the UE for deciphering of assistance data broadcast.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Broadcast Assistance Data Deciphering keys for GERAN Iu mode				
> Ciphering Key Flag	M		BIT STRING (SIZE(1))	Indicates the current Ciphering Key Flag that is used for the assistance data broadcast messages in the location area.
>Current Deciphering key	M		BIT STRING (SIZE(56))	Current deciphering key that is used for deciphering assistance data.
>Next Deciphering key	M		BIT STRING (SIZE(56))	Next deciphering key that will used for deciphering assistance data.

9.2.3.25 Requested GPS Assistance Data for GERAN Iu mode

This information element is used for indicating the requested GPS assistance data.

This IE is transparent to CN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Requested GPS Assistance Data for GERAN Iu mode			OCTET STRING (SIZE(1..38))	For the corresponding Information Element Definition see “gpsAssistanceData” [22].

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 subclause 10.3.6.

Subclause 9.3 presents the Abstract Syntax of RANAP protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this subclause and the tabular format in subclause 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,
    RAB-ModifyRequest,
    PrivateMessage,
    ResetResource,
    ResetResourceAcknowledge,
    RANAP-RelocationInformation,
    LocationRelatedDataRequest,
    LocationRelatedDataResponse,
    LocationRelatedDataFailure,
    LocationRelatedDataRequestGERANIuMode,
    LocationRelatedDataResponseGERANIuMode,
    LocationRelatedDataFailureGERANIuMode

FROM RANAP-PDU-Contents

    id-LocationRelatedData,
    id-LocationRelatedDataGERANIuMode,
    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-RAB-ModifyRequest,
    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               ,
    ... ,
    locationRelatedData____|
    locationRelatedDataGERANIuMode
}

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    ,
    ... ,
    rAB-ModifyRequest
}

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     reject
}

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

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

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

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

```
}

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

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


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

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     reject
}

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     reject
}

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

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

locationRelatedData RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      LocationRelatedDataRequest
    SUCCESSFUL OUTCOME      LocationRelatedDataResponse
    UNSUCCESSFUL OUTCOME    LocationRelatedDataFailure
    PROCEDURE CODE          id-LocationRelatedData
```

```
    CRITICALITY             reject
}

locationRelatedDataGERANIuMode RANAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      LocationRelatedDataRequestGERANIuMode
    SUCCESSFUL OUTCOME      LocationRelatedDataResponseGERANIuMode
    UNSUCCESSFUL OUTCOME    LocationRelatedDataFailureGERANIuMode
    PROCEDURE CODE          id-LocationRelatedDataGERANIuMode
    CRITICALITY             reject
}

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
    BroadcastAssistanceDataDecipheringKeys,
    LocationRelatedDataRequestType,
    BroadcastAssistanceDataDecipheringKeysGERANIuMode,
    LocationRelatedDataRequestTypeGERANIuMode,
    DataVolumeReference,
    CellLoadInformation,
    AreaIdentity,
    CN-DomainIndicator,
    Cause,
    CriticalityDiagnostics,
    ChosenEncryptionAlgorithm,
    ChosenIntegrityProtectionAlgorithm,
    ClassmarkInformation2,
    ClassmarkInformation3,
    DL-GTP-PDU-SequenceNumber,
```

```
    DL-N-PDU-SequenceNumber,
    DataVolumeReportingIndication,
    DRX-CycleLengthCoefficient,
    EncryptionInformation,
    GlobalCN-ID,
    GlobalRNC-ID,
    IntegrityProtectionInformation,
    InterSystemInformation-TransparentContainer,
    IuSignallingConnectionIdentifier,
    IuTransportAssociation,
    KeyStatus,
    L3-Information,
    LAI,
    LastKnownServiceArea,
    NAS-PDU,
    NAS-SynchronisationIndicator,
    NewBSS-To-OldBSS-Information,
    NonSearchingIndication,
    NumberOfSteps,
    OMC-ID,
    OldBSS-ToNewBSS-Information,
    PagingAreaID,
    PagingCause,
    PDP-TypeInformation,
    PermanentNAS-UE-ID,
    RAB-ID,
    RAB-Parameters,
    RAC,
    RelocationType,
    RequestType,
    Requested-RAB-Parameter-Values,
    SAI,
    SAPI,
    Service-Handover,
    SourceID,
    SourceRNC-ToTargetRNC-TransparentContainer,
    SourceRNC-PDCP-context-info,
    TargetID,
    TargetRNC-ToSourceRNC-TransparentContainer,
    TemporaryUE-ID,
    TraceReference,
    TraceType,
    UnsuccessfullyTransmittedDataVolume,
    TransportLayerAddress,
    TriggerID,
    UE-ID,
    UL-GTP-PDU-SequenceNumber,
    UL-N-PDU-SequenceNumber,
    UP-ModeVersions,
    UserPlaneMode,
    Alt-RAB-Parameters,
    Ass-RAB-Parameters
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-Alt-RAB-Parameters,
    id-Ass-RAB-Parameters,
    id-BroadcastAssistanceDataDecipheringKeys,
    id-LocationRelatedDataRequestType,
    id-BroadcastAssistanceDataDecipheringKeysGERANIuMode,
    id-LocationRelatedDataRequestTypeGERANIuMode,
    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-GlobalCN-ID,
    id-GlobalRNC-ID,
    id-IntegrityProtectionInformation,
    id-InterSystemInformation-TransparentContainer,
    id-IuSigConId,
    id-IuSigConIdItem,
    id-IuSigConIdList,
    id-IuTransportAssociation,
    id-KeyStatus,
    id-L3-Information,
    id-LAI,
    id-LastKnownServiceArea,
    id-NAS-PDU,
    id-NewBSS-To-OldBSS-Information,
```

```
    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-ModifyList,
    id-RAB-ModifyItem,
    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-SourceRNC-PDCP-context-info,
    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} }
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
-- **************************************************************
--
-- LOCATION RELATED DATA ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Location Related Data Request
--
-- **************************************************************

LocationRelatedDataRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LocationRelatedDataRequestIEs} },
    protocolExtensions      ProtocolExtensionContainer { {LocationRelatedDataRequestExtensions} }         OPTIONAL,
    ...
}

LocationRelatedDataRequestIEs RANAP-PROTOCOL-IES ::= {
    { ID id-LocationRelatedDataRequestType      CRITICALITY reject  TYPE LocationRelatedDataRequestType   PRESENCE mandatory   },
    ...
}
```

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

-- **************************************************************
--
-- Location Related Data Response
--
-- **************************************************************

LocationRelatedDataResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LocationRelatedDataResponseIEs} },
    protocolExtensions      ProtocolExtensionContainer { { LocationRelatedDataResponseExtensions} }          OPTIONAL,
    ...
}

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

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

-- **************************************************************
--
-- Location Related Data Failure
--
-- **************************************************************

LocationRelatedDataFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LocationRelatedDataFailureIEs} },
    protocolExtensions      ProtocolExtensionContainer { { LocationRelatedDataFailureExtensions} }          OPTIONAL,
    ...
}

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

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

-- **************************************************************
--
-- LOCATION RELATED DATA ELEMENTARY PROCEDURE FOR GERAN IU MODE
--
-- **************************************************************

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

```
--
-- Location Related Data Request for GERAN Iu mode
--
-- **************************************************************

LocationRelatedDataRequestGERANIuMode ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LocationRelatedDataRequestGERANIuModeIEs} },
    protocolExtensions      ProtocolExtensionContainer { {LocationRelatedDataRequestGERANIuModeExtensions} }          OPTIONAL,
    ...
}

LocationRelatedDataRequestGERANIuModeIEs RANAP-PROTOCOL-IES ::= {
    { ID id-LocationRelatedDataRequestTypeGERANIuMode       CRITICALITY reject  TYPE LocationRelatedDataRequestTypeGERANIuMode    PRESENCE mandatory
    },
    ...
}

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

-- **************************************************************
--
-- Location Related Data Response for GERAN Iu mode
--
-- **************************************************************

LocationRelatedDataResponseGERANIuMode ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LocationRelatedDataResponseGERANIuModeIEs} },
    protocolExtensions      ProtocolExtensionContainer { { LocationRelatedDataResponseGERANIuModeExtensions} }          OPTIONAL,
    ...
}

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

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

-- **************************************************************
--
-- Location Related Data Failure for GERAN Iu mode
--
-- **************************************************************

LocationRelatedDataFailureGERANIuMode ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LocationRelatedDataFailureGERANIuModeIEs} },
    protocolExtensions      ProtocolExtensionContainer { { LocationRelatedDataFailureGERANIuModeExtensions} }         OPTIONAL,
    ...
```

```
}

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

LocationRelatedDataFailureGERANIuModeExtensions 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,
    maxNrOfLevels,
    maxNrOfAltValues,

    id-MessageStructure,
    id-TypeOfError,

    id-DownlinkCellLoadInformation,
    id-UplinkCellLoadInformation
FROM RANAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
```

```
FROM RANAP-CommonDataTypes

    ProtocolExtensionContainer{},
    RANAP-PROTOCOL-EXTENSION
FROM RANAP-Containers;

-- A
```

Lots of unaffected ASN1 in 9.3.4 not shown

```
-- B

BindingID               ::= OCTET STRING (SIZE (4))

BroadcastAssistanceDataDecipheringKeys  ::= SEQUENCE {
    cipheringKeyFlag        BIT STRING (SIZE (1)),
    currentDecipheringKey   BIT STRING (SIZE (56)),
    nextDecipheringKey      BIT STRING (SIZE (56)),
    ...
}

BroadcastAssistanceDataDecipheringKeysGERANIuMode   ::= SEQUENCE {
    cipheringKeyFlag        BIT STRING (SIZE (1)),
    currentDecipheringKey   BIT STRING (SIZE (56)),
    nextDecipheringKey      BIT STRING (SIZE (56)),
    ...
}

-- C
```

Lots of unaffected ASN1 in 9.3.4 not shown

```
-- L

LAC                 ::= OCTET STRING (SIZE (2))

LAI ::= SEQUENCE {
    pLMNidentity                PLMNidentity,
    lAC             LAC,
    iE-Extensions           ProtocolExtensionContainer { {LAI-ExtIEs} } OPTIONAL
}

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

LastKnownServiceArea    ::= SEQUENCE {
    sAI         SAI,
    ageOfSAI    INTEGER (0..32767),
    iE-Extensions   ProtocolExtensionContainer { {LastKnownServiceArea-ExtIEs} } OPTIONAL,
    ...
}
```

```
LastKnownServiceArea-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

LocationRelatedDataRequestType  ::= SEQUENCE {
    requestedLocationRelatedDataType            RequestedLocationRelatedDataType,
    requestedGPSAssistanceData                  RequestedGPSAssistanceData  OPTIONAL,
    -- This IE shall be present if the Requested Location Related Data Type IE is set to 'Dedicated Assistance Data for Assisted GPS' --
    ...
}

LocationRelatedDataRequestTypeGERANIuMode   ::= SEQUENCE {
    requestedLocationRelatedDataTypeGERANIuMode         RequestedLocationRelatedDataTypeGERANIuMode,
    requestedGPSAssistanceDataGERANIuMode                   RequestedGPSAssistanceDataGERANIuMode OPTIONAL,
    -- This IE shall be present if the Requested Location Related Data Type for GERAN Iu mode IE is set to 'Dedicated Assistance Data for Assisted
GPS' --
    ...
}

L3-Information              ::= OCTET STRING

-- M
```

Lots of unaffected ASN1 in 9.3.4 not shown

```
ReportArea ::= ENUMERATED {
    service-area,
    geographical-area,
    ...
}

RequestedGPSAssistanceData  ::= OCTET STRING (SIZE (1 .. 38 ))
        -- gpsAssistanceData as defined in 24.080 --

RequestedLocationRelatedDataType ::= ENUMERATED {
    decipheringKeysUEBasedOTDOA,
    decipheringKeysAssistedGPS,
    dedicatedAssistanceDataUEBasedOTDOA,
    dedicatedAssistanceDataAssistedGPS,
    ...
}

RequestedGPSAssistanceDataGERANIuMode   ::= OCTET STRING (SIZE (1 .. 38 ))
        -- gpsAssistanceData as defined in 24.080 --

RequestedLocationRelatedDataTypeGERANIuMode ::= ENUMERATED {
    decipheringKeysEOTD,
    decipheringKeysAssistedGPS,
    dedicatedMobileBasedEOTDAssistanceData,
    dedicatedAssistanceDataAssistedGPS,
    dedicatedMobileAssistedEOTDAssistanceData,
```

```
    ...
}

Requested-RAB-Parameter-Values ::= SEQUENCE {
    requestedMaxBitrates                Requested-RAB-Parameter-MaxBitrateList          OPTIONAL,
    requestedGuaranteedBitrates             Requested-RAB-Parameter-GuaranteedBitrateList         OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { { Requested-RAB-Parameter-Values-ExtIEs} }  OPTIONAL,
    ...
}
```

Lots of unaffected ASN1 in 9.3.4 not shown

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
id-RAB-ModifyRequest                INTEGER ::= 29
```

```
id-LocationRelatedData              INTEGER ::= 30
id-LocationRelatedDataGERANIuMode   INTEGER ::= 31


-- **************************************************************
--
-- 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
maxNrOfLevels                       INTEGER ::= 256
maxNrOfAltValues                    INTEGER ::= 16


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
```

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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
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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
id-MessageStructure                             INTEGER ::= 88
id-Alt-RAB-Parameters                           INTEGER ::= 89
id-Ass-RAB-Parameters                           INTEGER ::= 90
id-RAB-ModifyList                               INTEGER ::= 91
id-RAB-ModifyItem                               INTEGER ::= 92
id-TypeOfError                                  INTEGER ::= 93
id-BroadcastAssistanceDataDecipheringKeys       INTEGER ::= 94
id-LocationRelatedDataRequestType               INTEGER ::= 95
id-GlobalCN-ID                                  INTEGER ::= 96
id-LastKnownServiceArea                         INTEGER ::= 97
id-InterSystemInformation-TransparentContainer  INTEGER ::= 98
id-NewBSS-To-OldBSS-Information                 INTEGER ::= 99
id-DownlinkCellLoadInformation                  INTEGER ::= 100
id-UplinkCellLoadInformation                    INTEGER ::= 101
id-SourceRNC-PDCP-context-info                  INTEGER ::= 102
id-BroadcastAssistanceDataDecipheringKeysGERANIuMode        INTEGER ::= x1
id-LocationRelatedDataRequestTypeGERANIuMode                INTEGER ::= x2

END
```

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden,19th – 23rd August 2002

Tdoc ⌘R3-022096

CR-Form-v7

CHANGE REQUEST

⌘ **25.414** **CR** **039** ⌘ **rev** **3** ⌘ Current version: **5.1.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☒

Title:	⌘	Necessary changes for the Iu UP support mode on Iu-cs for the IP transport option
Source:	⌘	RAN WG3
Work item code:	⌘	ETRAN-IPtrans
Date:	⌘	21/08/2002
Category:	⌘	**F**
Release:	⌘	REL-5

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

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	At RAN WG3 #29 the method to extract in the CN the source IP address / UDP port from the first received IP packet was agreed in order to enable the UP entity in the CN to reply to the Iu UP INIT frame on Iu-cs if the IP transport options is used and a RAB in Iu UP support mode is requested to be setup. At RAN3#31 it was approved to define the two addresses and UDP ports used by RNC to be the same. The linking to affected CN specifications is added. This is the corresponding CR.
Summary of change:	⌘	Chapter 5.1.3.2 (UDP/IP protocol in circuit switched domain) is enhanced to describe the method of extracting in the CN UP entity the source IP address / UDP port in order to be able to reply on the Iu UP INIT frame.
Consequences if not approved:	⌘	The Iu CS user plane in support mode will be unavailable when the IP transport option is chosen. Impact Assessment: This CR has no impact with the previous version of the specification (same release) because there is not yet such functionality present.

Clauses affected:	⌘	5.1.3.2			
Other specs affected:	⌘	**Y** / **N**		⌘	
		X /	Other core specifications		TS23.205, TS29.232
		/ **X**	Test specifications		
		/ **X**	O&M Specifications		

Other comments:	⌘	None

How to create CRs using this form:

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

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

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

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

5.1.3.2 UDP/IP

The path protocol used shall be UDP [12].

An IP RNC/CN-node shall support IPv6. The support of IPv4 is optional.

NOTE: This does not preclude single implementation and use of IPv4.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network.

There may be one or several IP addresses in the RNC and in the CN. The packet processing function in the CN shall send downstream packets of a given RAB to the RNC IP address / UDP port (received in RANAP) associated to that particular RAB. The packet processing function in the RNC shall send upstream packets of a given RAB to the CN IP address / UDP port (received in RANAP) associated to that particular RAB. If there is no RNC IP address / UDP port yet associated to the packet processing function in the CN for a RAB not yet finally set-up, the packet processing function in the CN for that RAB shall extract the source IP address / UDP port from the first received IP packet to identify the peer IP/UDP entity. The packet processing function in the RNC shall use the same source IP address / UDP port as is sent to CN in RANAP.

The RNC/CN-node shall use two consecutive port numbers for the RTP bearer and for the optional RTCP connection that transport a single Iu UP connection. Two such consecutive port numbers are termed “port number block” in what follows. The first port number shall be even and shall be assigned to the RTP protocol. The next port number shall be assigned to the RTCP protocol. This port shall be reserved even if the optional RTCP protocol is not used.

Each RNC/CN-node shall administer the port numbers it intends to use for RTP/RTCP port number blocks.