

**TSG RAN Meeting #25**  
**Palm Springs, USA, 07 - 09 September 2004**

**RP-040298**

**Title** CRs (Rel-5 and Rel-6 Category A) to TS 25.413 Addition of Relocation Failure cause code  
**Source** TSG RAN WG3  
**Agenda Item** 7.4.5

| RAN3 Tdoc | Spec   | curr. Vers. | new Vers. | CR  | Rev | Cat | Rel   | Title   | Work item     |
|-----------|--------|-------------|-----------|-----|-----|-----|-------|---|---------------|
| R3-041236 | 25.413 | 5.9.0       | 5.10.0    | 680 | 4   | F   | Rel-5 | Addition of Relocation Failure cause code to match GERAN cause code | RANimp_ImpRRM |
| R3-041237 | 25.413 | 6.2.0       | 6.3.0     | 681 | 4   | A   | Rel-6 | Addition of Relocation Failure cause code to match GERAN cause code | RANimp_ImpRRM |
|           |        |             |           |     |     |     |       |   |               |

**Note: These CRs are linked to TS 29.010 v5.6.0 CR109 and TS 29.010 v6.3.0 CR110 which are submitted to TSG-CN#25 for approval.**

## CHANGE REQUEST

# 25.413 CR 680 # rev 4 # Current version: 5.9.0 #

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

|                        |  |                 |   |
|------------------------|--|-----------------|---|
| <b>Title:</b>          | # Addition of Relocation Failure cause code to match GERAN cause code  |                 |   |
| <b>Source:</b>         | # RAN3   |                 |   |
| <b>Work item code:</b> | # RANimp_ImpRRM  | <b>Date:</b>    | # 20/08/2004  |
| <b>Category:</b>       | # <b>F</b>   | <b>Release:</b> | # Rel-5   |
|                        | Use <u>one</u> of the following categories:<br><b>F</b> (correction)<br><b>A</b> (corresponds to a correction in an earlier release)<br><b>B</b> (addition of feature),<br><b>C</b> (functional modification of feature)<br><b>D</b> (editorial modification)<br>Detailed explanations of the above categories can be found in 3GPP <a href="http://www.3gpp.org/Specs/tr21/900">TR 21.900</a> . |                 | Use <u>one</u> of the following releases:<br><b>Ph2</b> (GSM Phase 2)<br><b>R96</b> (Release 1996)<br><b>R97</b> (Release 1997)<br><b>R98</b> (Release 1998)<br><b>R99</b> (Release 1999)<br><b>Rel-4</b> (Release 4)<br><b>Rel-5</b> (Release 5)<br><b>Rel-6</b> (Release 6)<br><b>Rel-7</b> (Release 7) |

|                                      |  |
|--------------------------------------|--|
| <b>Reason for change:</b>            | # To capture the agreements of the joint meeting between GERAN and RAN3 on CRRM (Feb 2002). GERAN has added a relocation failure cause code but it has not been added to RANAP. This change is to remedy this omission.  |
| <b>Summary of change:</b>            | # Addition of cause code "Traffic load in the target cell higher than in the source cell" in the case of Cell Load Inter-System Handover, as a possible Relocation Preparation Failure cause and as a possible cause in the Relocation Failure message from TargetRNC to CN. |
| <b>Consequences if not approved:</b> | # Failure to add the above cause code will result in an inconsistency between the UTRAN and GERAN functional behaviour in the case of Cell Load-Based Inter-System Handover.   |

|                              |   |   |   |   |  |  |   |  |   |   |   |
|------------------------------|---|---|---|---|--|--|---|--|---|---|---|
| <b>Clauses affected:</b>     | # 8.6.3, 8.7.3, 9.2.1.4, 9.3.4  |   |   |   |  |  |   |  |   |   |   |
| <b>Other specs affected:</b> | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;">X</td> <td style="width: 20px;"></td> </tr> <tr> <td style="width: 20px;"></td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"></td> <td style="width: 20px;">X</td> </tr> </table> Other core specifications<br>Test specifications<br>O&M Specifications | Y | N | X |  |  | X |  | X | # | 3GPP TS 25.413 v6.2.0 CR681<br>3GPP TS 29.010 v5.6.0 CR109<br>3GPP TS 29.010 v6.3.0 CR110 |
| Y                            | N   |   |   |   |  |  |   |  |   |   |   |
| X                            |   |   |   |   |  |  |   |  |   |   |   |
|                              | X   |   |   |   |  |  |   |  |   |   |   |
|                              | X   |   |   |   |  |  |   |  |   |   |   |
| <b>Other comments:</b>       | #   |   |   |   |  |  |   |  |   |   |   |

**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.

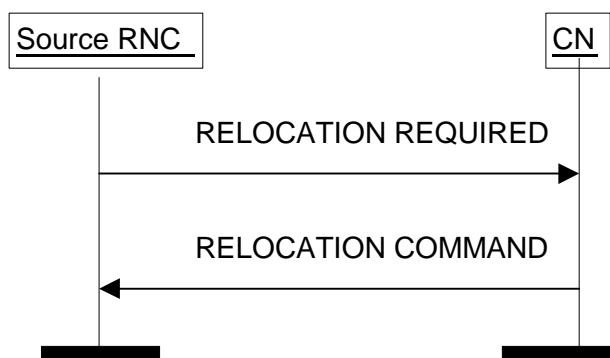
## 8.6 Relocation Preparation

### 8.6.1 General

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

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

### 8.6.2 Successful Operation



**Figure 5: Relocation Preparation procedure. Successful operation.**

The source RNC initiates the procedure by sending a RELOCATION REQUIRED message. The source RNC shall decide whether to initiate an intra-system Relocation or an 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", "Access Restricted Due to Shared Networks".

The source RNC shall determine whether the relocation of SRNS shall be executed with or without involvement of the UE. The source RNC shall set accordingly the *Relocation Type* IE 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 Instances* IE containing the number of Iu signalling connections existing for the UE .

Only in case of intra-system relocation, the *Source RNC to Target RNC Transparent Container* IE shall include the *Integrity Protection Key* IE from the last received domain on which the Security Mode Control procedure has been successfully performed, and the associated *Chosen Integrity Protection Algorithm* IE that has been selected for this domain.

Only in case of intra-system relocation, the *Source RNC to Target RNC Transparent Container* IE shall include the *Ciphering Key* IE for the signalling data from the last received domain on which the Security Mode Control procedure has been successfully performed, and the associated *Chosen Encryption Algorithm* IE that has been selected for this domain.

Only in case of intra-system relocation, for each domain where the Security Mode Control procedure has been successfully performed in the source RNC, the *Source RNC to Target RNC Transparent Container* IE shall include the *Chosen Encryption Algorithm* IE of CS (PS respectively) user data corresponding to the ciphering alternative that has been selected for this domain. If the Security Mode Control procedure had not been successful or performed for one domain or had proposed no ciphering alternative, the *Chosen Encryption Algorithm* IE for the user data of this domain

shall not be included. When both the CS and the PS user data *Chosen Encryption Algorithm* IEs are provided, they shall be the same.

This *Source RNC to Target RNC Transparent Container* IE 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), USCH(s) or HS-DSCH, the *Source RNC to Target RNC Transparent Container* IE shall:

- for each RAB include the RAB ID, the *CN Domain Indicator* IE and the mapping between each RAB subflow and transport channel identifier(s) over Iur, 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), USCH(s) or HS-DSCH, the DSCH ID(s), USCH ID(s) or HS-DSCH MAC-d Flow ID respectively shall be included,
- only in the case the active SRBs in SRNC are not all mapped onto the same DCH, include the *SRB TrCH Mapping* IE containing for each SRB the SRB ID and the associated transport channel identifier over Iur, i.e. if the SRB is carried on a DCH, the DCH ID shall be included, and when it is carried on DSCH or USCH, the DSCH ID or USCH ID 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 the *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. This information shall also include the source cell identifier the included traffic load values correspond to. In the case the UE is using, prior to the inter-system handover attempt, radio resources of more than one cell, it is implementation specific for which cell the source RNC should report the current traffic load and the cell identifier.

When the source RNC sends the RELOCATION REQUIRED message, it 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 a 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 the 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 the RELOCATION COMMAND message the source RNC shall stop the timer  $T_{RELOCprep}$ , start the timer  $T_{RELOCoverall}$  and terminate the Relocation Preparation procedure. The source RNC is then defined to have a Prepared Relocation for that Iu signalling connection.

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

#### Interactions with other procedures:

If, after a RELOCATION REQUIRED message is sent and before the Relocation Preparation procedure is terminated, the source RNC receives a RANAP message initiating another 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 the Relocation Cancel procedure with an appropriate value for the *Cause* IE, e.g. "Interaction with other procedure", and after successful completion of the 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 the 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 case the relocation is cancelled, the RNC shall resume any suspended procedures (if any).

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

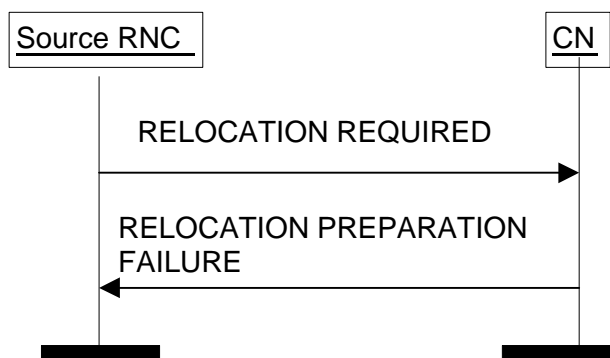
#### 8.6.2.1 Successful Operation for GERAN Iu-mode

The relocation between UTRAN and GERAN Iu-mode shall be considered in the Relocation Preparation procedure as intra-system relocation from RANAP point of view.

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the successful operation of the Relocation Preparation procedure:

- In case of a Relocation to GERAN Iu-mode (only for CS), the RNC shall include, if available, the *GERAN Classmark* IE within the RELOCATION REQUIRED message in those cases where the transmission of the *GERAN Classmark IE* is required, as defined in [27].

#### 8.6.3 Unsuccessful Operation



**Figure 6: Relocation Preparation procedure. Unsuccessful operation.**

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

The RELOCATION PREPARATION FAILURE message shall contain the appropriate value for the *Cause* IE, e.g. "T<sub>RELOCalloc</sub> expiry", "Relocation Failure in Target CN/RNC or Target System", "Relocation not supported in Target RNC or Target System", "Relocation Target not allowed", or "No Radio Resources Available in Target Cell" or "Traffic load in the target cell higher than in the source cell".

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

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

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

The RELOCATION PREPARATION FAILURE message may contain the *Inter-System Information Transparent Container* IE.

#### **Interactions with Relocation Cancel procedure:**

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

### **8.6.4 Abnormal Conditions**

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

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

**NOTE:** In case two CN domains are involved in the SRNS Relocation Preparation procedure and the Source RNC receives the *Target RNC to Source RNC Transparent Container* IE via two CN domains, it may check whether the content of the two *Target RNC to Source RNC Transparent Container* IE is the same. In case the Source RNC receives two different *Target RNC to Source RNC Transparent Container* IEs, the RNC behaviour is left implementation-specific.

### **8.6.5 Co-ordination of Two Iu Signalling Connections**

If the RNC decides to initiate the Relocation Preparation procedure for a UTRAN to UTRAN relocation, the RNC shall initiate simultaneously a Relocation Preparation procedure on all Iu signalling connections existing for the UE. The source RNC shall also include the same *Source RNC to Target RNC Transparent Container* IE, *Relocation Type* IE, *Source ID* IE and *Cause* IE in the RELOCATION REQUIRED message towards the two domains.

For intersystem handover to GSM, the Relocation Preparation procedure shall be initiated only towards the circuit-switched CN.

The source RNC shall not trigger the execution of relocation of SRNS unless it has received a RELOCATION COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been initiated.

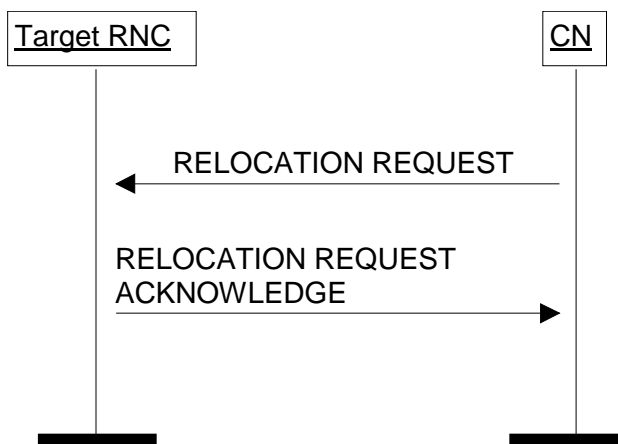
If the source RNC receives a RELOCATION PREPARATION FAILURE message from the CN, the RNC shall initiate the Relocation Cancel procedure on the other Iu signalling connection for the UE if the other Iu signalling connection exists and if the Relocation Preparation procedure is still ongoing or the procedure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

## 8.7 Relocation Resource Allocation

### 8.7.1 General

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

### 8.7.2 Successful Operation



**Figure 7: Relocation Resource Allocation procedure. Successful operation.**

The CN initiates the procedure by generating a RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, the message shall contain the information (if any) required by the UTRAN to build the same set of RABs 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.

When the CN transmits the RELOCATION REQUEST message, it 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 the following IEs:

- *Permanent NAS UE Identity* IE (if available);
- *Cause* IE;
- *CN Domain Indicator* IE;
- *Source RNC To Target RNC Transparent Container* IE;
- *Iu Signalling Connection Identifier* IE;
- *Integrity Protection Information* IE (if available);
- *SNA Access Information* IE (if available);
- *UESBI-Iu* 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 the following IEs:

- *RAB-ID* IE;



- *NAS Synchronisation Indicator IE* (if the relevant NAS information is provided by the CN);
- *RAB parameters IE*;
- *User Plane Information IE*;
- *Transport Layer Address IE*;
- *Iu Transport Association IE*;
- *Data Volume Reporting Indication IE* (only for PS);
- *PDP Type Information IE* (only for PS).

The RELOCATION REQUEST message may include the following IE:

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

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

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

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 IE*;
- *User plane Information IE* (i.e. required User Plane Mode and required User Plane Versions);
- *Priority level IE*, *Queuing Allowed IE*, *Pre-emption Capability IE* and *Pre-emption Vulnerability IE*;
- *Service Handover IE*.

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".

For a RAB setup, the *RAB Parameters IE* may contain the *Signalling Indication IE*. The *Signalling Indication IE* shall not be present if the *Traffic Class IE* is not set to "Interactive" or if the *CN Domain Indicator IE* is not set to "PS domain".

If the RELOCATION REQUEST message includes the Permanent NAS UE identity (i.e. IMSI), the RNC shall associate the permanent identity to the RRC Connection of that user and shall save it for the duration of the RRC connection.

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. The value for the *Iu Signalling Connection Identifier IE* shall be allocated so as to uniquely identify an Iu signalling connection for the involved CN node. The RNC shall store and remember this identifier for the duration of the Iu connection.

The RNC shall, if supported, use the *UESBI-Iu IE* when included in the RELOCATION REQUEST message.

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.

In case of intra-system relocation, if no *Integrity Protection Key IE* (*Ciphering Key IE* respectively) is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC shall not start integrity protection (*ciphering* respectively).

In case of intra-system relocation, when an *Ciphering Key IE* is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC may select to use a ciphering alternative where an algorithm is used. It shall in this case make use of this key to cipher its signalling data whatever the selected algorithm. The *Encryption Key IE* that is contained within the *Encryption Information IE* of the RELOCATION REQUEST message shall never be considered for ciphering of signalling data.

In case of intra-system relocation, when an *Integrity Protection Key IE* is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC shall select one integrity algorithm to start integrity and shall in this case make use of this key whatever the selected algorithm. The integrity protection key that is contained within the *Integrity Protection Information IE* of the RELOCATION REQUEST message shall never be considered.

In case of inter-system relocation, the integrity protection and ciphering information to be considered shall be the ones received in the *Integrity Protection Information IE* and *Encryption Information IE* of the RELOCATION REQUEST message.

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.

The following additional actions shall be executed in the target RNC during the 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 in the *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 do(es) 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 the target RNC, the radio bearers shall be ignored during the relocation of SRNS and the radio bearers shall be released by the 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 a RELOCATION REQUEST ACKNOWLEDGE message to the CN.

For each RAB successfully setup the RNC shall include the 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 the Relocation Resource Allocation procedure, 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 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 the 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.

In case of inter-system relocation, the RNC shall include the *Chosen Integrity Protection Algorithm* IE (*Chosen Encryption Algorithm* IE respectively) within the RELOCATION REQUEST ACKNOWLEDGE message, if, and only if the *Integrity Protection Information* IE (*Encryption Information* IE respectively) was included in the RELOCATION REQUEST message.

In case of intra-system relocation, the RNC shall include the *Chosen Integrity Protection Algorithm* IE (*Chosen Encryption Algorithm* IE respectively) within the RELOCATION REQUEST ACKNOWLEDGE message, if, and only if the *Integrity Protection Key* IE (*Ciphering Key* IE respectively) was included within the *Source RNC-to-Target RNC transparent container* 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 UE.

If the *SNA Access Information* IE is contained in the RELOCATION REQUEST message, the target RNC shall store this information and use it to determine whether the UE has access to radio resources in the UTRAN. The target RNC shall consider that the UE is authorised to access only the PLMNs identified by the *PLMN identity* IE in the *SNA Access Information* IE. If the *Authorised SNAs* IE is included for a given PLMN (identified by the *PLMN identity* IE), then the target RNC shall consider that the access to radio resources for the concerned UE is restricted to the LAs contained in the SNAs identified by the *SNAC* IEs.

If the *SNA Access Information* IE is not contained in the RELOCATION REQUEST message, the target RNC shall consider that no access restriction applies to the UE in the UTRAN.

Transmission and reception of a RELOCATION REQUEST ACKNOWLEDGE message terminate the procedure in the UTRAN and in 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".

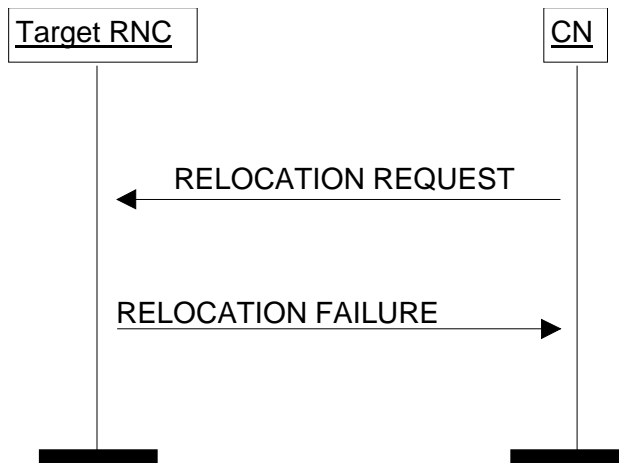
### 8.7.2.1 Successful Operation for GERAN Iu-mode

The relocation between UTRAN and GERAN Iu-mode shall be considered in the Relocation Resource Allocation procedure as intra-system relocation from RANAP point of view.

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the successful operation of the Relocation Resource Allocation procedure:

- In case of GERAN Iu-mode, for RAB requested to be relocated from the the CS domain, the RELOCATION REQUEST message may contain the *GERAN BSC Container* IE in order to provide GERAN specific information to the target BSC (see [27]).

### 8.7.3 Unsuccessful Operation



**Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.**

If the target RNC can not even partially accept the relocation of SRNS or a failure occurs during the Relocation Resource Allocation procedure in the target RNC, the target RNC shall send a RELOCATION FAILURE message to the CN. The RELOCATION FAILURE message shall contain the *Cause* IE with an appropriate value. If the target RNC cannot support any of the integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE or *Encryption Information* IE, it shall return a RELOCATION FAILURE message with the cause “Requested Ciphering and/or Integrity Protection algorithms not supported”.

If the target RNC cannot support the relocation due to PUESBINE feature, it shall return a RELOCATION FAILURE message with the cause “Incoming Relocation Not Supported Due To PUESBINE Feature”.

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

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

In 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 shall contain the *Cause* IE with an appropriate value, e.g. "No Radio Resources Available in Target Cell" or “Traffic load in the target cell higher than in the source cell”.
- If the *Cause* IE received in the RELOCATION REQUEST message contains the value “Reduce Load in Serving Cell” and the load in the target cell is greater than in the source cell then, if the target cell is not in a congested or blocked state, the RNC shall return a RELOCATION FAILURE message which may include the cause “Traffic load in the target cell higher than in the source cell”.
- When the RNC returns a RELOCATION FAILURE message with the cause “Traffic load in the target cell higher than in the source cell”, it shall also include the *NewBSS to Old BSS Information* IE. This information shall include the current traffic load in the target cell.

#### 8.7.3.1 Unsuccessful Operation for GERAN Iu-mode

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the unsuccessful operation of the Relocation Resource Allocation procedure:

- In case a Relocation to GERAN Iu-mode fails (only for CS), because the Target BSC cannot provide an appropriate RAB corresponding to the content of the *GERAN BSC Container* IE (if received), the Target BSC shall report the unsuccessful Relocation Resource Allocation by indicating the cause value "GERAN Iu-mode Failure" within the RELOCATION FAILURE message and shall include the *GERAN Classmark* IE.

## 8.7.4 Abnormal Conditions

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

If the target RNC receives a *Source RNC to Target RNC Transparent Container* IE containing *Chosen Integrity Protection (Encryption* respectively) *Algorithm* IE without *Integrity Protection (Ciphering* respectively) *Key* IE, it shall return a RELOCATION FAILURE message with the cause "Conflict with already existing Integrity protection and/or Ciphering information".

### Interactions with Iu Release procedure:

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

NOTE: In case two CN domains are involved in the Relocation Resource Allocation procedure, the target RNC may check whether the content of the two *Source RNC to Target RNC Transparent Container* IEs or the two *SNA Access Information* IEs is the same. In case the target RNC receives two different *Source RNC to Target RNC Transparent Container* IEs or two different *SNA Access Information* IEs, the RNC behaviour is left implementation specific.

## 8.7.5 Co-ordination of Two Iu Signalling Connections

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

When both the CS and PS user data *Chosen Encryption Algorithm* IE are received within the *Source RNC to Target RNC Transparent Container* IE and if these two received *Chosen Encryption Algorithm* IE are not the same, the target RNC shall fail the Relocation Resource Allocation procedure by sending back a RELOCATION FAILURE message.

The integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE (*Encryption Information* IE respectively) of the RELOCATION REQUEST messages received from both CN domains shall have at least one common alternative, otherwise the Relocation Resource Allocation shall be failed by sending back a RELOCATION FAILURE message.

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly from each CN domain within the RELOCATION REQUEST messages, to co-ordinate both Iu signalling connections.
- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE messages only after all expected RELOCATION REQUEST messages are received and analysed.
- If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, the target RNC shall ensure that the same *Target RNC to Source RNC Transparent Container* IE is included in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domains and related to the same relocation of SRNS.

If the target RNC receives the *UESBI-Iu* IE on the Iu-CS but not on the Iu-PS interface (or vice versa), the RNC shall, if supported, use the *UESBI-Iu* IE for both domains.

Next Clause Changed

#### 9.2.1.4 Cause

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

| IE/Group Name   | Presence | Range | IE type and reference   | Semantics description         |
|---|----------|-------|---|-------------------------------|
| <p>Choice <b>Cause</b></p> <p>&gt;Radio Network Layer Cause</p> |          |       | <p>INTEGER (RAB pre-empted(1),</p> <p>Trelocoverall Expiry(2),</p> <p>Trelocprep Expiry(3),</p> <p>Treloccomplete Expiry(4),</p> <p>Tqueuing Expiry(5),</p> <p>Relocation Triggered(6),</p> <p>Unable to Establish During Relocation(8),</p> <p>Unknown Target RNC(9),</p> <p>Relocation Cancelled(10),</p> <p>Successful Relocation(11),</p> <p>Requested Ciphering and/or Integrity Protection Algorithms not Supported(12),</p> <p>Conflict with already existing Integrity protection and/or Ciphering information (13),</p> <p>Failure in the Radio Interface Procedure(14),</p> <p>Release due to UTRAN Generated Reason(15),</p> <p>User Inactivity(16),</p> <p>Time Critical Relocation(17),</p> <p>Requested Traffic Class not Available(18),</p> <p>Invalid RAB Parameters Value(19),</p> | <p>Value range is 1 – 64.</p> |

| IE/Group Name | Presence | Range | IE type and reference   | Semantics description |
|---------------|----------|-------|---|-----------------------|
| Choice Cause  |          |       |   |                       |
|               |          |       | Requested Maximum Bit Rate not Available(20),<br>Requested Maximum Bit Rate for DL not Available(33),<br>Requested Maximum Bit Rate for UL not Available(34),<br>Requested Guaranteed Bit Rate not Available(21),<br>Requested Guaranteed Bit Rate for DL not Available(35),<br>Requested Guaranteed Bit Rate for UL not Available(36),<br>Requested Transfer Delay not Achievable(22),<br>Invalid RAB Parameters Combination(23),<br>Condition Violation for SDU Parameters(24),<br>Condition Violation for Traffic Handling Priority(25),<br>Condition Violation for Guaranteed Bit Rate(26),<br>User Plane Versions not Supported(27),<br>Iu UP Failure(28),<br>TRELAlloc Expiry (7),<br>Relocation Failure in Target CN/RNC or Target System (29),<br>Invalid RAB |                       |



| IE/Group Name | Presence | Range | IE type and reference   | Semantics description |
|---------------|----------|-------|---|-----------------------|
| Choice Cause  |          |       | ID(30),<br>No remaining RAB(31),<br>Interaction with other procedure(32),<br>Repeated Integrity Checking Failure(37),<br>Requested Request Type not supported(38),<br>Request superseded(39),<br>Release due to UE generated signalling connection release(40),<br>Resource Optimisation Relocation(41),<br>Requested Information Not Available(42),<br>Relocation desirable for radio reasons (43),<br>Relocation not supported in Target RNC or Target system(44),<br>Directed Retry (45),<br>Radio Connection With UE Lost(46),<br>RNC unable to establish all RFCs (47),<br>Deciphering Keys Not Available(48),<br>Dedicated Assistance data Not Available(49),<br>Relocation Target not allowed(50),<br>Location Reporting Congestion(51), |                       |

| IE/Group Name | Presence | Range | IE type and reference  | Semantics description |
|---------------|----------|-------|--|-----------------------|
| Choice Cause  |          |       | Reduce Load in Serving Cell (52),<br>No Radio Resources Available in Target cell (53),<br>GERAN Iu-mode failure (54),<br>Access Restricted Due to Shared Networks(55),<br>Incoming Relocation Not Supported Due To PUESBINE Feature(56),<br><a href="#">Traffic Load In The Target Cell Higher Than In The Source Cell(57)</a> |                       |

| IE/Group Name          | Presence | Range | IE type and reference   | Semantics description  |
|------------------------|----------|-------|---|--|
| Choice Cause           |          |       |   |  |
| >Transport Layer Cause |          |       | INTEGER<br>(<br>Signalling<br>Transport<br>Resource<br>Failure(65),<br><br>lu Transport<br>Connection Failed<br>to Establish(66))   | Value range is 65 – 80.  |
| >NAS Cause             |          |       | INTEGER<br>(User Restriction<br>Start<br>Indication(81),<br><br>User Restriction<br>End<br>Indication(82),<br><br>Normal<br>Release(83))  | Value range is 81 – 96.  |
| >Protocol Cause        |          |       | INTEGER<br>(Transfer Syntax<br>Error(97),<br><br>Semantic Error<br>(98),<br><br>Message not<br>compatible with<br>receiver state<br>(99),<br><br>Abstract Syntax<br>Error (Reject)<br>(100),<br><br>Abstract Syntax<br>Error (Ignore and<br>Notify) (101),<br><br>Abstract Syntax<br>Error (Falsely<br>Constructed<br>Message) (102)) | Value range is 97 – 112.   |
| >Miscellaneous Cause   |          |       | INTEGER<br>(O&M<br>Intervention(113),<br><br>No Resource<br>Available(114),<br><br>Unspecified<br>Failure(115),<br><br>Network<br>Optimisation(116))  | Value range is 113 – 128.  |
| >Non-standard Cause    |          |       | INTEGER<br>( )  | Value range is 129 – 256.<br>Cause value 256 shall not be<br>used. |

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

| <b>Radio Network Layer cause</b>   | <b>Meaning</b>  |
|--|---|
| Deciphering Keys Not Available   | The action failed because RNC is not able to provide requested deciphering keys.  |
| Conflict with already existing Integrity protection and/or Ciphering information | The action was not performed due to that the requested security mode configuration was in conflict with the already existing security mode configuration. |
| Condition Violation For Guaranteed Bit Rate                                      | The action was not performed due to condition violation for guaranteed bit rate.  |
| Condition Violation For SDU Parameters   | The action was not performed due to condition violation for SDU parameters.   |
| Condition Violation For Traffic Handling Priority                                | The action was not performed due to condition violation for traffic handling priority.  |
| Dedicated Assistance data Not Available  | The action failed because RNC is not able to successfully deliver the requested dedicated assistance data to the UE.                                      |
| Directed Retry   | The reason for action is Directed Retry   |
| Failure In The Radio Interface Procedure   | Radio interface procedure has failed.   |
| Incoming Relocation Not Supported Due To PUESBINE Feature                        | The incoming relocation cannot be accepted by the target RNC because of the PUESBINE feature.   |
| Interaction With Other Procedure   | Relocation was cancelled due to interaction with other procedure.   |
| Invalid RAB ID   | The action failed because the RAB ID is unknown in the RNC.   |
| Invalid RAB Parameters Combination   | The action failed due to invalid RAB parameters combination.  |
| Invalid RAB Parameters Value   | The action failed due to invalid RAB parameters value.  |
| Iu UP Failure  | The action failed due to Iu UP failure.   |
| No remaining RAB   | The reason for the action is no remaining RAB.  |
| RAB Pre-empted   | The reason for the action is that RAB is pre-empted.  |
| Radio Connection With UE Lost  | The action is requested due to losing radio connection to the UE  |
| Release Due To UE Generated Signalling Connection Release                        | Release requested due to UE generated signalling connection release.  |
| Release Due To UTRAN Generated Reason  | Release is initiated due to UTRAN generated reason.   |
| Relocation Cancelled   | The reason for the action is relocation cancellation.   |
| Relocation Desirable for Radio Reasons   | The reason for requesting relocation is radio related.  |
| Relocation Failure In Target CN/RNC Or Target System                             | Relocation failed due to a failure in target CN/RNC or target system.   |
| Relocation Not Supported In Target RNC Or Target System                          | Relocation failed because relocation was not supported in target RNC or target system.  |
| Relocation Target not allowed  | Relocation to the indicated target cell is not allowed for the UE in question.  |
| Relocation Triggered   | The action failed due to relocation.  |
| Repeated Integrity Checking Failure  | The action is requested due to repeated failure in integrity checking.  |
| Request Superseded   | The action failed because there was a second request on the same RAB.   |
| Requested Ciphering And/Or Integrity Protection Algorithms Not Supported         | The UTRAN or the UE is unable to support the requested ciphering and/or integrity protection algorithms.  |
| Requested Guaranteed Bit Rate For DL Not Available                               | The action failed because requested guaranteed bit rate for DL is not available.  |
| Requested Guaranteed Bit Rate For UL Not Available                               | The action failed because requested guaranteed bit rate for UL is not available.  |
| Requested Guaranteed Bit Rate Not Available                                      | The action failed because requested guaranteed bit rate is not available.   |
| Requested Information Not Available  | The action failed because requested information is not available.   |
| Requested Maximum Bit Rate For DL Not Available                                  | The action failed because requested maximum bit rate for DL is not available.   |
| Requested Maximum Bit Rate For UL Not Available                                  | The action failed because requested maximum bit rate for UL is not available.   |
| Requested Maximum Bit Rate Not Available   | The action failed because requested maximum bit rate is not available.  |
| Requested Request Type Not Supported   | The RNC is not supporting the requested location request type either because it doesn't support the requested event or                                    |

|  |   |
|--|---|
|  | it doesn't support the requested report area.   |
| Location Reporting Congestion  | The action was not performed due to an inability to support location reporting caused by overload.  |
| Requested Traffic Class Not Available  | The action failed because requested traffic class is not available.   |
| Requested Transfer Delay Not Achievable  | The action failed because requested transfer delay is not achievable.   |
| Resource Optimisation Relocation   | The reason for requesting relocation is resource optimisation.  |
| Successful Relocation  | The reason for the action is completion of successful relocation.   |
| Time Critical Relocation   | Relocation is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where the connection is likely to be dropped if relocation is not performed. |
| T <sub>QUEUING</sub> Expiry  | The action failed due to expiry of the timer T <sub>QUEUING</sub> .   |
| T <sub>RELOCalloc</sub> Expiry   | Relocation Resource Allocation procedure failed due to expiry of the timer T <sub>RELOCalloc</sub> .  |
| T <sub>RELOCcomplete</sub> Expiry  | The reason for the action is expiry of timer T <sub>RELOCcomplete</sub> .   |
| T <sub>RELOCoverall</sub> Expiry   | The reason for the action is expiry of timer T <sub>RELOCoverall</sub> .  |
| T <sub>RELOCprep</sub> Expiry  | Relocation Preparation procedure is cancelled when timer T <sub>RELOCprep</sub> expires.  |
| Unable To Establish During Relocation  | RAB failed to establish during relocation because it cannot be supported in the target RNC.   |
| Unknown Target RNC   | Relocation rejected because the target RNC is not known to the CN.  |
| User Inactivity  | The action is requested due to user inactivity on one or several non real time RABs e.g. in order to optimise radio resource.   |
| User Plane Versions Not Supported  | The action failed because requested user plane versions were not supported.   |
| RNC unable to establish all RFCs   | RNC couldn't establish all RAB subflow combinations indicated within the <i>RAB Parameters</i> IE.  |
| Reduce Load in Serving Cell  | Load on serving cell needs to be reduced.   |
| No Radio Resources Available in Target Cell                                    | Load on target cell is too high.  |
| GERAN Iu-mode failure  | The RAB establishment/modification/relocation failed because the GERAN BSC cannot provide an appropriate RAB due to limited capabilities within GERAN.  |
| Access Restricted Due to Shared Networks                                       | Access is not permitted in the cell due to Shared Networks.   |
| <a href="#">Traffic Load In The Target Cell Higher Than In The Source Cell</a> | <a href="#">Relocation to reduce load in the source cell is rejected, as the target cell's traffic load is higher than that in the source cell.</a>   |

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

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

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

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

## Next Clause Changed

## 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,
    maxNrOfSRBs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,
    maxNrOfAltValues,
    maxNrOfSNAs,
    maxNrOfLAs,
    maxNrOfPLMNsSN,
    maxSet,

    id-CN-DomainIndicator,
    id-MessageStructure,
    id-SRB-TrCH-Mapping,
    id-TypeOfError,

    id-hS-DSCH-MAC-d-Flow-ID,
    id-SignallingIndication,
    id-CellLoadInformationGroup
FROM RANAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
FROM RANAP-CommonDataTypes

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

-- A

AllocationOrRetentionPriority ::= SEQUENCE {
    priorityLevel          PriorityLevel,
    pre-emptionCapability  Pre-emptionCapability,
    pre-emptionVulnerability  Pre-emptionVulnerability,
    queuingAllowed        QueuingAllowed,
    iE-Extensions         ProtocolExtensionContainer { {AllocationOrRetentionPriority-ExtIEs} }
OPTIONAL,
    ...
}

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

Alt-RAB-Parameters ::= SEQUENCE {
    altMaxBitrateInf          Alt-RAB-Parameter-MaxBitrateInf          OPTIONAL,
    altGuaranteedBitrateInf   Alt-RAB-Parameter-GuaranteedBitrateInf  OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {Alt-RAB-Parameters-ExtIEs} } OPTIONAL,

```

```

}
...
}
Alt-RAB-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
...
}
Alt-RAB-Parameter-GuaranteedBitrateInf ::= SEQUENCE {
altGuaranteedBitrateType      Alt-RAB-Parameter-GuaranteedBitrateType,
altGuaranteedBitrates         Alt-RAB-Parameter-GuaranteedBitrates      OPTIONAL
-- This IE shall be present if the Type of Guaranteed Bit Rates Information IE is set to "Value
range" or "Discrete values" --,
...
}
Alt-RAB-Parameter-GuaranteedBitrateType ::= ENUMERATED{
unspecified,
value-range,
discrete-values,
...
}
Alt-RAB-Parameter-GuaranteedBitrates ::= SEQUENCE (SIZE (1..maxNrOfAltValues)) OF
Alt-RAB-Parameter-GuaranteedBitrateList

Alt-RAB-Parameter-GuaranteedBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
GuaranteedBitrate

Alt-RAB-Parameter-MaxBitrateInf ::= SEQUENCE {
altMaxBitrateType             Alt-RAB-Parameter-MaxBitrateType,
altMaxBitrates                Alt-RAB-Parameter-MaxBitrates           OPTIONAL
-- This IE shall be present if the Type of Alternative Maximun Bit Rates Information IE is set
to "Value range" or "Discrete values" --,
...
}
Alt-RAB-Parameter-MaxBitrateType ::= ENUMERATED{
unspecified,
value-range,
discrete-values,
...
}
Alt-RAB-Parameter-MaxBitrates ::= SEQUENCE (SIZE (1..maxNrOfAltValues)) OF
Alt-RAB-Parameter-MaxBitrateList

Alt-RAB-Parameter-MaxBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
MaxBitrate

AreaIdentity ::= CHOICE {
sAI          SAI,
geographicalArea      GeographicalArea,
...
}
Ass-RAB-Parameters ::= SEQUENCE {
assMaxBitrateInf      Ass-RAB-Parameter-MaxBitrateList      OPTIONAL,
assGuaranteedBitRateInf  Ass-RAB-Parameter-GuaranteedBitrateList  OPTIONAL,
iE-Extensions        ProtocolExtensionContainer { {Ass-RAB-Parameters-ExtIEs} }  OPTIONAL,
...
}
Ass-RAB-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
...
}
Ass-RAB-Parameter-GuaranteedBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
GuaranteedBitrate

Ass-RAB-Parameter-MaxBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
MaxBitrate

```



```

AuthorisedPLMNs ::= SEQUENCE (SIZE (1..maxNrOfPLMNsSN)) OF
  SEQUENCE {
    pLMNidentity          PLMNidentity,
    authorisedSNAsList    AuthorisedSNAs    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { {AuthorisedPLMNs-ExtIEs} } OPTIONAL,
    ...
  }

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

AuthorisedSNAs ::= SEQUENCE (SIZE (1..maxNrOfSNAs)) OF SNAC

-- B

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

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

-- C

Cause ::= CHOICE {
  radioNetwork          CauseRadioNetwork,
  transmissionNetwork  CauseTransmissionNetwork,
  nAS                   CauseNAS,
  protocol              CauseProtocol,
  misc                  CauseMisc,
  non-Standard         CauseNon-Standard,
  ...
}

CauseMisc ::= INTEGER {
  om-intervention (113),
  no-resource-available (114),
  unspecified-failure (115),
  network-optimisation (116)
} (113..128)

CauseNAS ::= INTEGER {
  user-restriction-start-indication (81),
  user-restriction-end-indication (82),
  normal-release (83)
} (81..96)

CauseProtocol ::= INTEGER {
  transfer-syntax-error (97),
  semantic-error (98),
  message-not-compatible-with-receiver-state (99),
  abstract-syntax-error-reject (100),
  abstract-syntax-error-ignore-and-notify (101),
  abstract-syntax-error-falsely-constructed-message (102)
} (97..112)

CauseRadioNetwork ::= INTEGER {
  rab-pre-empted (1),
  trelocoverall-expiry (2),
  trelocprep-expiry (3),
  treloccomplete-expiry (4),
  tqueing-expiry (5),
  relocation-triggered (6),
  trellocalloc-expiry(7),
  unable-to-establish-during-relocation (8),
  unknown-target-rnc (9),
  relocation-cancelled (10),
  successful-relocation (11),
  requested-ciphering-and-or-integrity-protection-algorithms-not-supported (12),
  conflict-with-already-existing-integrity-protection-and-or-ciphering-information (13),
  failure-in-the-radio-interface-procedure (14),
  release-due-to-utran-generated-reason (15),

```

```
user-inactivity (16),
time-critical-relocation (17),
requested-traffic-class-not-available (18),
invalid-rab-parameters-value (19),
requested-maximum-bit-rate-not-available (20),
requested-guaranteed-bit-rate-not-available (21),
requested-transfer-delay-not-achievable (22),
invalid-rab-parameters-combination (23),
condition-violation-for-sdu-parameters (24),
condition-violation-for-traffic-handling-priority (25),
condition-violation-for-guaranteed-bit-rate (26),
user-plane-versions-not-supported (27),
iu-up-failure (28),
relocation-failure-in-target-CN-RNC-or-target-system(29),
invalid-RAB-ID (30),
no-remaining-rab (31),
interaction-with-other-procedure (32),
requested-maximum-bit-rate-for-dl-not-available (33),
requested-maximum-bit-rate-for-ul-not-available (34),
requested-guaranteed-bit-rate-for-dl-not-available (35),
requested-guaranteed-bit-rate-for-ul-not-available (36),
repeated-integrity-checking-failure (37),
requested-request-type-not-supported (38),
request-superseded (39),
release-due-to-UE-generated-signalling-connection-release (40),
resource-optimisation-relocation (41),
requested-information-not-available (42),
relocation-desirable-for-radio-reasons (43),
relocation-not-supported-in-target-RNC-or-target-system (44),
directed-retry (45),
radio-connection-with-UE-Lost (46),
rNC-unable-to-establish-all-RFCs (47),
deciphering-keys-not-available(48),
dedicated-assistance-data-not-available(49),
relocation-target-not-allowed (50),
location-reporting-congestion (51),
reduce-load-in-serving-cell (52),
no-radio-resources-available-in-target-cell (53),
gERAN-Iumode-failure (54),
access-restricted-due-to-shared-networks (55),
incoming-relocation-not-supported-due-to-PUESBINE-feature (56),
traffic-load-in-the-target-cell-higher-than-in-the-source-cell (57)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)
-- Cause value 256 shall not be used --

CauseTransmissionNetwork ::= INTEGER {
    signalling-transport-resource-failure (65),
    iu-transport-connection-failed-to-establish (66)
} (65..80)
```

**This Subclause continues. No more Changes.**

**3GPP TSG-RAN3 Meeting #43**  
**Prague, Czech Republic, August 16<sup>th</sup>-20<sup>th</sup>, 2004**

**Tdoc #R3-041237**

|   |
|---|
| CR-Form-v7  |
| <b>CHANGE REQUEST</b>   |
| ⌘ <b>25.413 CR 681</b> ⌘ rev <b>4</b> ⌘ Current version: <b>6.2.0</b> ⌘ |

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

|                        |   |                 |  |
|------------------------|---|-----------------|--|
| <b>Title:</b>          | ⌘ Addition of Relocation Failure cause code to match GERAN cause code   |                 |  |
| <b>Source:</b>         | ⌘ RAN3  |                 |  |
| <b>Work item code:</b> | ⌘ RANimp_ImpRRM   | <b>Date:</b>    | ⌘ 20/08/2004   |
| <b>Category:</b>       | ⌘ <b>A</b>  | <b>Release:</b> | ⌘ Rel-6  |
|                        | Use <u>one</u> of the following categories:<br><b>F</b> (correction)<br><b>A</b> (corresponds to a correction in an earlier release)<br><b>B</b> (addition of feature),<br><b>C</b> (functional modification of feature)<br><b>D</b> (editorial modification)<br>Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> . |                 | Use <u>one</u> of the following releases:<br>Ph2 (GSM Phase 2)<br>R96 (Release 1996)<br>R97 (Release 1997)<br>R98 (Release 1998)<br>R99 (Release 1999)<br>Rel-4 (Release 4)<br>Rel-5 (Release 5)<br>Rel-6 (Release 6)<br>Rel-7 (Release 7) |

|                                      |   |
|--------------------------------------|---|
| <b>Reason for change:</b>            | ⌘ To capture the agreements of the joint meeting between GERAN and RAN3 on CRRM (Feb 2002). GERAN has added a relocation failure cause code but it has not been added to RANAP. This change is to remedy this omission.   |
| <b>Summary of change:</b>            | ⌘ Addition of cause code "Traffic load in the target cell higher than in the source cell" in the case of Cell Load Inter-System Handover, as a possible Relocation Preparation Failure cause and as a possible cause in the Relocation Failure message from Target RNC to CN. |
| <b>Consequences if not approved:</b> | ⌘ Failure to add the above cause code will result in an inconsistency between the UTRAN and GERAN functional behaviour in the case of Cell Load-Based Inter-System Handover.  |

|                              |   |   |   |   |  |  |   |  |   |   |   |
|------------------------------|---|---|---|---|--|--|---|--|---|---|---|
| <b>Clauses affected:</b>     | ⌘ 8.6.3, 8.7.3, 9.2.1.4, 9.3.4  |   |   |   |  |  |   |  |   |   |   |
| <b>Other specs affected:</b> | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> </table> Other core specifications<br>Test specifications<br>O&M Specifications | Y | N | X |  |  | X |  | X | ⌘ | 3GPP TS 25.413 v5.9.0 CR680<br>3GPP TS 29.010 v5.6.0 CR109<br>3GPP TS 29.010 v6.3.0 CR110 |
| Y                            | N   |   |   |   |  |  |   |  |   |   |   |
| X                            |   |   |   |   |  |  |   |  |   |   |   |
|                              | X   |   |   |   |  |  |   |  |   |   |   |
|                              | X   |   |   |   |  |  |   |  |   |   |   |
| <b>Other comments:</b>       | ⌘   |   |   |   |  |  |   |  |   |   |   |

**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.

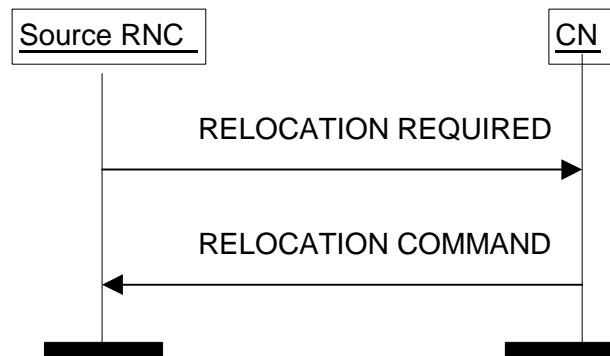
## 8.6 Relocation Preparation

### 8.6.1 General

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

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

### 8.6.2 Successful Operation



**Figure 5: Relocation Preparation procedure. Successful operation.**

The source RNC initiates the procedure by sending a RELOCATION REQUIRED message. The source RNC shall decide whether to initiate an intra-system Relocation or an 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", "Access Restricted Due to Shared Networks".

The source RNC shall determine whether the relocation of SRNS shall be executed with or without involvement of the UE. The source RNC shall set accordingly the *Relocation Type* IE 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 Instances* IE containing the number of Iu signalling connections existing for the UE .

Only in case of intra-system relocation, the *Source RNC to Target RNC Transparent Container* IE shall include the *Integrity Protection Key* IE from the last received domain on which the Security Mode Control procedure has been successfully performed, and the associated *Chosen Integrity Protection Algorithm* IE that has been selected for this domain.

Only in case of intra-system relocation, the *Source RNC to Target RNC Transparent Container* IE shall include the *Ciphering Key* IE for the signalling data from the last received domain on which the Security Mode Control procedure has been successfully performed, and the associated *Chosen Encryption Algorithm* IE that has been selected for this domain.

Only in case of intra-system relocation, for each domain where the Security Mode Control procedure has been successfully performed in the source RNC, the *Source RNC to Target RNC Transparent Container* IE shall include the *Chosen Encryption Algorithm* IE of CS (PS respectively) user data corresponding to the ciphering alternative that has been selected for this domain. If the Security Mode Control procedure had not been successful or performed for one domain or had proposed no ciphering alternative, the *Chosen Encryption Algorithm* IE for the user data of this domain

shall not be included. When both the CS and the PS user data *Chosen Encryption Algorithm* IEs are provided, they shall be the same.

This *Source RNC to Target RNC Transparent Container* IE 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), USCH(s) or HS-DSCH, the *Source RNC to Target RNC Transparent Container* IE shall:

- for each RAB include the RAB ID, the *CN Domain Indicator* IE and the mapping between each RAB subflow and transport channel identifier(s) over Iur, 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), USCH(s) or HS-DSCH, the DSCH ID(s), USCH ID(s) or HS-DSCH MAC-d Flow ID respectively shall be included,
- only in the case the active SRBs in SRNC are not all mapped onto the same DCH, include the *SRB TrCH Mapping* IE containing for each SRB the SRB ID and the associated transport channel identifier over Iur, i.e. if the SRB is carried on a DCH, the DCH ID shall be included, and when it is carried on DSCH or USCH, the DSCH ID or USCH ID 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 a Trace Recording Session is active in the Source RNC due to a Signalling Based Activation (see ref [37]), the *Trace Recording Session Information* IE containing information identifying the Trace Record being generated may be included in the *Source RNC to Target RNC Transparent Container* IE.

In case of inter-system handover to GSM the RNC:

- shall include the *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. This information shall also include the source cell identifier the included traffic load values correspond to. In the case the UE is using, prior to the inter-system handover attempt, radio resources of more than one cell, it is implementation specific for which cell the source RNC should report the current traffic load and the cell identifier.

When the source RNC sends the RELOCATION REQUIRED message, it shall start the timer  $T_{\text{RELOCprep}}$ .

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 a RELOCATION COMMAND message to the source RNC and the CN shall start the timer  $T_{\text{RELOCcomplete}}$ .

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  $T_{\text{DATAfwd}}$ .

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

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

#### Interactions with other procedures:

If, after a RELOCATION REQUIRED message is sent and before the Relocation Preparation procedure is terminated, the source RNC receives a RANAP message initiating another 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 the Relocation Cancel procedure with an appropriate value for the *Cause* IE, e.g. "Interaction with other procedure", and after successful completion of the 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 the 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 case the relocation is cancelled, the RNC shall resume any suspended procedures (if any).

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

### 8.6.2.1 Successful Operation for GERAN Iu-mode

The relocation between UTRAN and GERAN Iu-mode shall be considered in the Relocation Preparation procedure as intra-system relocation from RANAP point of view.

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the successful operation of the Relocation Preparation procedure:

- In case of a Relocation to GERAN Iu-mode (only for CS), the RNC shall include, if available, the *GERAN Classmark* IE within the RELOCATION REQUIRED message in those cases where the transmission of the *GERAN Classmark* IE is required, as defined in [27].

### 8.6.3 Unsuccessful Operation

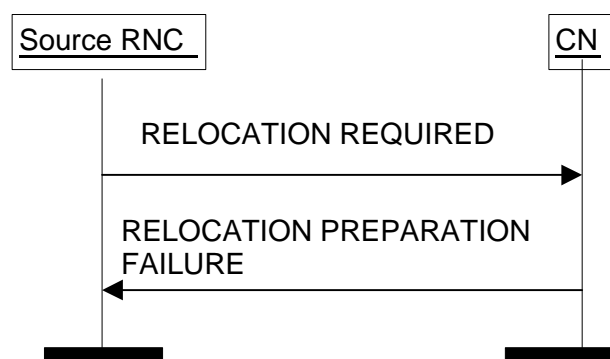


Figure 6: Relocation Preparation procedure. Unsuccessful operation.

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

The RELOCATION PREPARATION FAILURE message shall contain the appropriate value for the *Cause* IE, e.g. "T<sub>RELOCalloc</sub> expiry", "Relocation Failure in Target CN/RNC or Target System", "Relocation not supported in Target RNC or Target System", "Relocation Target not allowed", ~~or~~ "No Radio Resources Available in Target Cell" [or "Traffic load in the target cell higher than in the source cell"](#).

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

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

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

The RELOCATION PREPARATION FAILURE message may contain the *Inter-System Information Transparent Container* IE.

#### **Interactions with Relocation Cancel procedure:**

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

### **8.6.4 Abnormal Conditions**

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

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

**NOTE:** In case two CN domains are involved in the SRNS Relocation Preparation procedure and the Source RNC receives the *Target RNC to Source RNC Transparent Container* IE via two CN domains, it may check whether the content of the two *Target RNC to Source RNC Transparent Container* IE is the same. In case the Source RNC receives two different *Target RNC to Source RNC Transparent Container* IEs, the RNC behaviour is left implementation-specific.

### **8.6.5 Co-ordination of Two Iu Signalling Connections**

If the RNC decides to initiate the Relocation Preparation procedure for a UTRAN to UTRAN relocation, the RNC shall initiate simultaneously a Relocation Preparation procedure on all Iu signalling connections existing for the UE. The source RNC shall also include the same *Source RNC to Target RNC Transparent Container* IE, *Relocation Type* IE, *Source ID* IE and *Cause* IE in the RELOCATION REQUIRED message towards the two domains.

For intersystem handover to GSM, the Relocation Preparation procedure shall be initiated only towards the circuit-switched CN.

The source RNC shall not trigger the execution of relocation of SRNS unless it has received a RELOCATION COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been initiated.

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

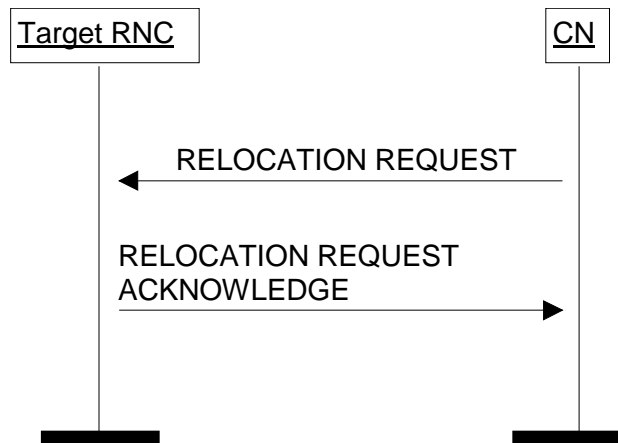


## 8.7 Relocation Resource Allocation

### 8.7.1 General

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

### 8.7.2 Successful Operation



**Figure 7: Relocation Resource Allocation procedure. Successful operation.**

The CN initiates the procedure by generating a RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, the message shall contain the information (if any) required by the UTRAN to build the same set of RABs 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.

When the CN transmits the RELOCATION REQUEST message, it 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 the following IEs:

- *Permanent NAS UE Identity* IE (if available);
- *Cause* IE;
- *CN Domain Indicator* IE;
- *Source RNC To Target RNC Transparent Container* IE;
- *Iu Signalling Connection Identifier* IE;
- *Integrity Protection Information* IE (if available);
- *SNA Access Information* IE (if available);
- *UESBI-Iu* 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 the following IEs:

- *RAB-ID* IE;

- *NAS Synchronisation Indicator IE* (if the relevant NAS information is provided by the CN);
- *RAB parameters IE*;
- *User Plane Information IE*;
- *Transport Layer Address IE*;
- *Iu Transport Association IE*;
- *Data Volume Reporting Indication IE* (only for PS);
- *PDP Type Information IE* (only for PS).

The RELOCATION REQUEST message may include the following IE:

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

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

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

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 IE*;
- *User plane Information IE* (i.e. required User Plane Mode and required User Plane Versions);
- *Priority level IE*, *Queuing Allowed IE*, *Pre-emption Capability IE* and *Pre-emption Vulnerability IE*;
- *Service Handover IE*.

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".

For a RAB setup, the *RAB Parameters IE* may contain the *Signalling Indication IE*. The *Signalling Indication IE* shall not be present if the *Traffic Class IE* is not set to "Interactive" or if the *CN Domain Indicator IE* is not set to "PS domain".

If the RELOCATION REQUEST message includes the Permanent NAS UE identity (i.e. IMSI), the RNC shall associate the permanent identity to the RRC Connection of that user and shall save it for the duration of the RRC connection.

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. The value for the *Iu Signalling Connection Identifier IE* shall be allocated so as to uniquely identify an Iu signalling connection for the involved CN node. The RNC shall store and remember this identifier for the duration of the Iu connection.

The RNC shall, if supported, use the *UESBI-Iu IE* when included in the RELOCATION REQUEST message.

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.

In case of intra-system relocation, if no *Integrity Protection Key IE* (*Ciphering Key IE* respectively) is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC shall not start integrity protection (*ciphering* respectively).

In case of intra-system relocation, when an *Ciphering Key IE* is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC may select to use a ciphering alternative where an algorithm is used. It shall in this case make use of this key to cipher its signalling data whatever the selected algorithm. The *Encryption Key IE* that is contained within the *Encryption Information IE* of the RELOCATION REQUEST message shall never be considered for ciphering of signalling data.

In case of intra-system relocation, when an *Integrity Protection Key IE* is provided within the *Source RNC to Target RNC Transparent Container IE*, the target RNC shall select one integrity algorithm to start integrity and shall in this case make use of this key whatever the selected algorithm. The integrity protection key that is contained within the *Integrity Protection Information IE* of the RELOCATION REQUEST message shall never be considered.

In case of intra-system relocation, when a *Trace Recording Session Information IE* is provided within the *Source RNC to Target RNC Transparent Container IE*, the Target RNC should store that information to include it in a potential future Trace Record for that UE.

In case of inter-system relocation, the integrity protection and ciphering information to be considered shall be the ones received in the *Integrity Protection Information IE* and *Encryption Information IE* of the RELOCATION REQUEST message.

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.

The following additional actions shall be executed in the target RNC during the 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 in the *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 do(es) 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 the target RNC, the radio bearers shall be ignored during the relocation of SRNS and the radio bearers shall be released by the 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 a RELOCATION REQUEST ACKNOWLEDGE message to the CN.

For each RAB successfully setup the RNC shall include the 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 the Relocation Resource Allocation procedure, 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 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 the 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.

In case of inter-system relocation, the RNC shall include the *Chosen Integrity Protection Algorithm* IE (*Chosen Encryption Algorithm* IE respectively) within the RELOCATION REQUEST ACKNOWLEDGE message, if, and only if the *Integrity Protection Information* IE (*Encryption Information* IE respectively) was included in the RELOCATION REQUEST message.

In case of intra-system relocation, the RNC shall include the *Chosen Integrity Protection Algorithm* IE (*Chosen Encryption Algorithm* IE respectively) within the RELOCATION REQUEST ACKNOWLEDGE message, if, and only if the *Integrity Protection Key* IE (*Ciphering Key* IE respectively) was included within the *Source RNC-to-Target RNC transparent container* 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 UE.

If the *SNA Access Information* IE is contained in the RELOCATION REQUEST message, the target RNC shall store this information and use it to determine whether the UE has access to radio resources in the UTRAN. The target RNC shall consider that the UE is authorised to access only the PLMNs identified by the *PLMN identity* IE in the *SNA Access Information* IE. If the *Authorised SNAs* IE is included for a given PLMN (identified by the *PLMN identity* IE), then the target RNC shall consider that the access to radio resources for the concerned UE is restricted to the LAs contained in the SNAs identified by the *SNAC* IEs.

If the *SNA Access Information* IE is not contained in the RELOCATION REQUEST message, the target RNC shall consider that no access restriction applies to the UE in the UTRAN.

Transmission and reception of a RELOCATION REQUEST ACKNOWLEDGE message terminate the procedure in the UTRAN and in 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".

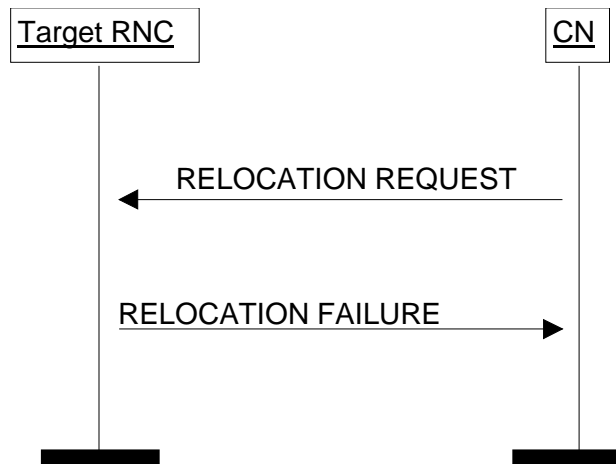
### 8.7.2.1 Successful Operation for GERAN Iu-mode

The relocation between UTRAN and GERAN Iu-mode shall be considered in the Relocation Resource Allocation procedure as intra-system relocation from RANAP point of view.

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the successful operation of the Relocation Resource Allocation procedure:

- In case of GERAN Iu-mode, for RAB requested to be relocated from the the CS domain, the RELOCATION REQUEST message may contain the *GERAN BSC Container* IE in order to provide GERAN specific information to the target BSC (see [27]).

### 8.7.3 Unsuccessful Operation



**Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.**

If the target RNC can not even partially accept the relocation of SRNS or a failure occurs during the Relocation Resource Allocation procedure in the target RNC, the target RNC shall send a RELOCATION FAILURE message to the CN. The RELOCATION FAILURE message shall contain the *Cause* IE with an appropriate value.

If the target RNC cannot support any of the integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE or *Encryption Information* IE, it shall return a RELOCATION FAILURE message with the cause “Requested Ciphering and/or Integrity Protection algorithms not supported”.

If the target RNC cannot support the relocation due to PUESBINE feature, it shall return a RELOCATION FAILURE message with the cause “Incoming Relocation Not Supported Due To PUESBINE Feature”.

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

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

In 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 shall contain the *Cause* IE with an appropriate value, e.g. "No Radio Resources Available in Target Cell" or "[Traffic load in the target cell higher than in the source cell](#)".
- If the *Cause* IE received in the RELOCATION REQUEST message contains the value “Reduce Load in Serving Cell” and the load in the target cell is greater than in the source cell then, if the target cell is not in a congested or blocked state, the RNC shall return a RELOCATION FAILURE message which may include the cause “Traffic load in the target cell higher than in the source cell”.
- When the RNC returns a RELOCATION FAILURE message with the cause “Traffic load in the target cell higher than in the source cell”, it shall also include the *NewBSS to Old BSS Information* IE. This information shall include the current traffic load in the target cell.

### 8.7.3.1 Unsuccessful Operation for GERAN Iu-mode

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the unsuccessful operation of the Relocation Resource Allocation procedure:

- In case a Relocation to GERAN Iu-mode fails (only for CS), because the Target BSC cannot provide an appropriate RAB corresponding to the content of the *GERAN BSC Container* IE (if received), the Target BSC shall report the unsuccessful Relocation Resource Allocation by indicating the cause value "GERAN Iu-mode Failure" within the RELOCATION FAILURE message and shall include the *GERAN Classmark* IE.

### 8.7.4 Abnormal Conditions

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

If the target RNC receives a *Source RNC to Target RNC Transparent Container* IE containing *Chosen Integrity Protection (Encryption respectively) Algorithm* IE without *Integrity Protection (Ciphering respectively) Key* IE, it shall return a RELOCATION FAILURE message with the cause "Conflict with already existing Integrity protection and/or Ciphering information".

#### Interactions with Iu Release procedure:

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

- NOTE: In case two CN domains are involved in the Relocation Resource Allocation procedure, the target RNC may check whether the content of the two *Source RNC to Target RNC Transparent Container* IEs or the two *SNA Access Information* IEs is the same. In case the target RNC receives two different *Source RNC to Target RNC Transparent Container* IEs or two different *SNA Access Information* IEs, the RNC behaviour is left implementation specific.

### 8.7.5 Co-ordination of Two Iu Signalling Connections

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

When both the CS and PS user data *Chosen Encryption Algorithm* IE are received within the *Source RNC to Target RNC Transparent Container* IE and if these two received *Chosen Encryption Algorithm* IE are not the same, the target RNC shall fail the Relocation Resource Allocation procedure by sending back a RELOCATION FAILURE message.

The integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE (*Encryption Information* IE respectively) of the RELOCATION REQUEST messages received from both CN domains shall have at least one common alternative, otherwise the Relocation Resource Allocation shall be failed by sending back a RELOCATION FAILURE message.

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly from each CN domain within the RELOCATION REQUEST messages, to co-ordinate both Iu signalling connections.
- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE messages only after all expected RELOCATION REQUEST messages are received and analysed.
- If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, the target RNC shall ensure that the same *Target RNC to Source RNC Transparent Container* IE is included in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domains and related to the same relocation of SRNS.

If the target RNC receives the *UESBI-Iu* IE on the Iu-CS but not on the Iu-PS interface (or vice versa), the RNC shall, if supported, use the *UESBI-Iu* IE for both domains.

**Next Clause Changed**

#### 9.2.1.4 Cause

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

| IE/Group Name  | Presence | Range | IE type and reference   | Semantics description  |
|--|----------|-------|---|------------------------|
| Choice <b>Cause</b><br>>Radio Network Layer<br>Cause |          |       | INTEGER<br>(RAB pre-empted(1),<br>Trelocoverall<br>Expiry(2),<br>Trelocprep<br>Expiry(3),<br>Treloccomplete<br>Expiry(4),<br>Tqueuing<br>Expiry(5),<br>Relocation<br>Triggered(6),<br>Unable to<br>Establish During<br>Relocation(8),<br>Unknown Target<br>RNC(9),<br>Relocation<br>Cancelled(10),<br>Successful<br>Relocation(11),<br>Requested<br>Ciphering and/or<br>Integrity<br>Protection<br>Algorithms not<br>Supported(12),<br>Conflict with<br>already existing<br>Integrity protection<br>and/or Ciphering<br>information (13),<br>Failure in the<br>Radio Interface<br>Procedure(14),<br>Release due to<br>UTRAN<br>Generated<br>Reason(15),<br>User<br>Inactivity(16),<br>Time Critical<br>Relocation(17),<br>Requested Traffic<br>Class not<br>Available(18),<br>Invalid RAB<br>Parameters<br>Value(19), | Value range is 1 – 64. |



| IE/Group Name | Presence | Range | IE type and reference  | Semantics description |
|---------------|----------|-------|--|-----------------------|
| Choice Cause  |          |       |  |                       |
|               |          |       | <p>Requested Maximum Bit Rate not Available(20),</p> <p>Requested Maximum Bit Rate for DL not Available(33),</p> <p>Requested Maximum Bit Rate for UL not Available(34),</p> <p>Requested Guaranteed Bit Rate not Available(21),</p> <p>Requested Guaranteed Bit Rate for DL not Available(35),</p> <p>Requested Guaranteed Bit Rate for UL not Available(36),</p> <p>Requested Transfer Delay not Achievable(22),</p> <p>Invalid RAB Parameters Combination(23),</p> <p>Condition Violation for SDU Parameters(24),</p> <p>Condition Violation for Traffic Handling Priority(25),</p> <p>Condition Violation for Guaranteed Bit Rate(26),</p> <p>User Plane Versions not Supported(27),</p> <p>Iu UP Failure(28),</p> <p>TRELOCalloc Expiry (7),</p> <p>Relocation Failure in Target CN/RNC or Target System (29),</p> <p>Invalid RAB</p> |                       |

| IE/Group Name | Presence | Range | IE type and reference  | Semantics description |
|---------------|----------|-------|--|-----------------------|
| Choice Cause  |          |       | ID(30),  |                       |
|               |          |       | No remaining RAB(31),<br>Interaction with other procedure(32),<br>Repeated Integrity Checking Failure(37),<br>Requested Request Type not supported(38),<br>Request superseded(39),<br>Release due to UE generated signalling connection release(40),<br>Resource Optimisation Relocation(41),<br>Requested Information Not Available(42),<br>Relocation desirable for radio reasons (43),<br>Relocation not supported in Target RNC or Target system(44),<br>Directed Retry (45),<br>Radio Connection With UE Lost(46),<br>RNC unable to establish all RFCs (47),<br>Deciphering Keys Not Available(48),<br>Dedicated Assistance data Not Available(49),<br>Relocation Target not allowed(50),<br>Location Reporting Congestion(51), |                       |

| IE/Group Name | Presence | Range | IE type and reference  | Semantics description |
|---------------|----------|-------|--|-----------------------|
| Choice Cause  |          |       | Reduce Load in Serving Cell (52),<br>No Radio Resources Available in Target cell (53),<br>GERAN lu-mode failure (54),<br>Access Restricted Due to Shared Networks(55),<br>Incoming Relocation Not Supported Due To PUESBINE Feature(56),<br><a href="#">Traffic Load In The Target Cell Higher Than In The Source Cell(57)</a> |                       |

| IE/Group Name          | Presence | Range | IE type and reference   | Semantics description  |
|------------------------|----------|-------|---|--|
| Choice Cause           |          |       |   |  |
| >Transport Layer Cause |          |       | INTEGER<br>(<br>Signalling<br>Transport<br>Resource<br>Failure(65),<br><br>lu Transport<br>Connection Failed<br>to Establish(66))   | Value range is 65 – 80.  |
| >NAS Cause             |          |       | INTEGER<br>(User Restriction<br>Start<br>Indication(81),<br><br>User Restriction<br>End<br>Indication(82),<br><br>Normal<br>Release(83))  | Value range is 81 – 96.  |
| >Protocol Cause        |          |       | INTEGER<br>(Transfer Syntax<br>Error(97),<br><br>Semantic Error<br>(98),<br><br>Message not<br>compatible with<br>receiver state<br>(99),<br><br>Abstract Syntax<br>Error (Reject)<br>(100),<br><br>Abstract Syntax<br>Error (Ignore and<br>Notify) (101),<br><br>Abstract Syntax<br>Error (Falsely<br>Constructed<br>Message) (102)) | Value range is 97 – 112.   |
| >Miscellaneous Cause   |          |       | INTEGER<br>(O&M<br>Intervention(113),<br><br>No Resource<br>Available(114),<br><br>Unspecified<br>Failure(115),<br><br>Network<br>Optimisation(116))  | Value range is 113 – 128.  |
| >Non-standard Cause    |          |       | INTEGER<br>( )  | Value range is 129 – 256.<br>Cause value 256 shall not be<br>used. |

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

| <b>Radio Network Layer cause</b>   | <b>Meaning</b>  |
|--|---|
| Deciphering Keys Not Available   | The action failed because RNC is not able to provide requested deciphering keys.  |
| Conflict with already existing Integrity protection and/or Ciphering information | The action was not performed due to that the requested security mode configuration was in conflict with the already existing security mode configuration. |
| Condition Violation For Guaranteed Bit Rate                                      | The action was not performed due to condition violation for guaranteed bit rate.  |
| Condition Violation For SDU Parameters   | The action was not performed due to condition violation for SDU parameters.   |
| Condition Violation For Traffic Handling Priority                                | The action was not performed due to condition violation for traffic handling priority.  |
| Dedicated Assistance data Not Available  | The action failed because RNC is not able to successfully deliver the requested dedicated assistance data to the UE.                                      |
| Directed Retry   | The reason for action is Directed Retry   |
| Failure In The Radio Interface Procedure   | Radio interface procedure has failed.   |
| Incoming Relocation Not Supported Due To PUESBINE Feature                        | The incoming relocation cannot be accepted by the target RNC because of the PUESBINE feature.   |
| Interaction With Other Procedure   | Relocation was cancelled due to interaction with other procedure.   |
| Invalid RAB ID   | The action failed because the RAB ID is unknown in the RNC.   |
| Invalid RAB Parameters Combination   | The action failed due to invalid RAB parameters combination.  |
| Invalid RAB Parameters Value   | The action failed due to invalid RAB parameters value.  |
| Iu UP Failure  | The action failed due to Iu UP failure.   |
| No remaining RAB   | The reason for the action is no remaining RAB.  |
| RAB Pre-empted   | The reason for the action is that RAB is pre-empted.  |
| Radio Connection With UE Lost  | The action is requested due to losing radio connection to the UE  |
| Release Due To UE Generated Signalling Connection Release                        | Release requested due to UE generated signalling connection release.  |
| Release Due To UTRAN Generated Reason  | Release is initiated due to UTRAN generated reason.   |
| Relocation Cancelled   | The reason for the action is relocation cancellation.   |
| Relocation Desirable for Radio Reasons   | The reason for requesting relocation is radio related.  |
| Relocation Failure In Target CN/RNC Or Target System                             | Relocation failed due to a failure in target CN/RNC or target system.   |
| Relocation Not Supported In Target RNC Or Target System                          | Relocation failed because relocation was not supported in target RNC or target system.  |
| Relocation Target not allowed  | Relocation to the indicated target cell is not allowed for the UE in question.  |
| Relocation Triggered   | The action failed due to relocation.  |
| Repeated Integrity Checking Failure  | The action is requested due to repeated failure in integrity checking.  |
| Request Superseded   | The action failed because there was a second request on the same RAB.   |
| Requested Ciphering And/Or Integrity Protection Algorithms Not Supported         | The UTRAN or the UE is unable to support the requested ciphering and/or integrity protection algorithms.  |
| Requested Guaranteed Bit Rate For DL Not Available                               | The action failed because requested guaranteed bit rate for DL is not available.  |
| Requested Guaranteed Bit Rate For UL Not Available                               | The action failed because requested guaranteed bit rate for UL is not available.  |
| Requested Guaranteed Bit Rate Not Available                                      | The action failed because requested guaranteed bit rate is not available.   |
| Requested Information Not Available  | The action failed because requested information is not available.   |
| Requested Maximum Bit Rate For DL Not Available                                  | The action failed because requested maximum bit rate for DL is not available.   |
| Requested Maximum Bit Rate For UL Not Available                                  | The action failed because requested maximum bit rate for UL is not available.   |
| Requested Maximum Bit Rate Not Available   | The action failed because requested maximum bit rate is not available.  |
| Requested Request Type Not Supported   | The RNC is not supporting the requested location request type either because it doesn't support the requested event or                                    |

|  |   |
|--|---|
|  | it doesn't support the requested report area.   |
| Location Reporting Congestion  | The action was not performed due to an inability to support location reporting caused by overload.  |
| Requested Traffic Class Not Available  | The action failed because requested traffic class is not available.   |
| Requested Transfer Delay Not Achievable  | The action failed because requested transfer delay is not achievable.   |
| Resource Optimisation Relocation   | The reason for requesting relocation is resource optimisation.  |
| Successful Relocation  | The reason for the action is completion of successful relocation.   |
| Time Critical Relocation   | Relocation is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where the connection is likely to be dropped if relocation is not performed. |
| T <sub>QUEUING</sub> Expiry  | The action failed due to expiry of the timer T <sub>QUEUING</sub> .   |
| T <sub>RELOCalloc</sub> Expiry   | Relocation Resource Allocation procedure failed due to expiry of the timer T <sub>RELOCalloc</sub> .  |
| T <sub>RELOCcomplete</sub> Expiry  | The reason for the action is expiry of timer T <sub>RELOCcomplete</sub> .   |
| T <sub>RELOCoverall</sub> Expiry   | The reason for the action is expiry of timer T <sub>RELOCoverall</sub> .  |
| T <sub>RELOCprep</sub> Expiry  | Relocation Preparation procedure is cancelled when timer T <sub>RELOCprep</sub> expires.  |
| Unable To Establish During Relocation  | RAB failed to establish during relocation because it cannot be supported in the target RNC.   |
| Unknown Target RNC   | Relocation rejected because the target RNC is not known to the CN.  |
| User Inactivity  | The action is requested due to user inactivity on one or several non real time RABs e.g. in order to optimise radio resource.   |
| User Plane Versions Not Supported  | The action failed because requested user plane versions were not supported.   |
| RNC unable to establish all RFCs   | RNC couldn't establish all RAB subflow combinations indicated within the <i>RAB Parameters</i> IE.  |
| Reduce Load in Serving Cell  | Load on serving cell needs to be reduced.   |
| No Radio Resources Available in Target Cell                                    | Load on target cell is too high.  |
| GERAN Iu-mode failure  | The RAB establishment/modification/relocation failed because the GERAN BSC cannot provide an appropriate RAB due to limited capabilities within GERAN.  |
| Access Restricted Due to Shared Networks                                       | Access is not permitted in the cell due to Shared Networks.   |
| <a href="#">Traffic Load In The Target Cell Higher Than In The Source Cell</a> | <a href="#">Relocation to reduce load in the source cell is rejected, as the target cell's traffic load is higher than that in the source cell.</a>   |

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

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

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

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

### Next Clause Changed

## 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,
    maxNrOfSRBs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,
    maxNrOfAltValues,
    maxNrOfSNAs,
    maxNrOfLAs,
    maxNrOfPLMNsSN,
    maxSet,
    maxNrOfUEsToBeTraced,
    maxNrOfInterfaces,

    id-CN-DomainIndicator,
    id-MessageStructure,
    id-SRB-TrCH-Mapping,
    id-TypeOfError,

    id-hS-DSCH-MAC-d-Flow-ID,
    id-SignallingIndication,
    id-CellLoadInformationGroup,
    id-TraceRecordingSessionInformation
FROM RANAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
FROM RANAP-CommonDataTypes

    ProtocolExtensionContainer{},
RANAP-PROTOCOL-EXTENSION
```

```

FROM RANAP-Containers;

-- A

AccuracyFulfilmentIndicator ::= ENUMERATED{
    requested-Accuracy-Fulfilled,
    requested-Accuracy-Not-Fulfilled,
    ...
}

AllocationOrRetentionPriority ::= SEQUENCE {
    priorityLevel          PriorityLevel,
    pre-emptionCapability  Pre-emptionCapability,
    pre-emptionVulnerability  Pre-emptionVulnerability,
    queuingAllowed         QueuingAllowed,
    iE-Extensions          ProtocolExtensionContainer { {AllocationOrRetentionPriority-ExtIEs} }
OPTIONAL,
    ...
}

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

Alt-RAB-Parameters ::= SEQUENCE {
    altMaxBitrateInf          Alt-RAB-Parameter-MaxBitrateInf          OPTIONAL,
    altGuaranteedBitRateInf  Alt-RAB-Parameter-GuaranteedBitrateInf  OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {Alt-RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

Alt-RAB-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Alt-RAB-Parameter-GuaranteedBitrateInf ::= SEQUENCE {
    altGuaranteedBitrateType  Alt-RAB-Parameter-GuaranteedBitrateType,
    altGuaranteedBitrates     Alt-RAB-Parameter-GuaranteedBitrates   OPTIONAL
    -- This IE shall be present if the Type of Guaranteed Bit Rates Information IE is set to "Value
range" or "Discrete values" --,
    ...
}

Alt-RAB-Parameter-GuaranteedBitrateType ::= ENUMERATED{
    unspecified,
    value-range,
    discrete-values,
    ...
}

Alt-RAB-Parameter-GuaranteedBitrates ::= SEQUENCE (SIZE (1..maxNrOfAltValues)) OF
    Alt-RAB-Parameter-GuaranteedBitrateList

Alt-RAB-Parameter-GuaranteedBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
    GuaranteedBitrate

Alt-RAB-Parameter-MaxBitrateInf ::= SEQUENCE {
    altMaxBitrateType          Alt-RAB-Parameter-MaxBitrateType,
    altMaxBitrates             Alt-RAB-Parameter-MaxBitrates          OPTIONAL
    -- This IE shall be present if the Type of Alternative Maximun Bit Rates Information IE is set
to "Value range" or "Discrete values" --,
    ...
}

Alt-RAB-Parameter-MaxBitrateType ::= ENUMERATED{
    unspecified,
    value-range,
    discrete-values,
    ...
}

Alt-RAB-Parameter-MaxBitrates ::= SEQUENCE (SIZE (1..maxNrOfAltValues)) OF
    Alt-RAB-Parameter-MaxBitrateList

```



```

Alt-RAB-Parameter-MaxBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
MaxBitrate

AreaIdentity ::= CHOICE {
    sAI                SAI,
    geographicalArea    GeographicalArea,
    ...
}

Ass-RAB-Parameters ::= SEQUENCE {
    assMaxBitrateInf        Ass-RAB-Parameter-MaxBitrateList                OPTIONAL,
    assGuaranteedBitRateInf Ass-RAB-Parameter-GuaranteedBitrateList          OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {Ass-RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

Ass-RAB-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Ass-RAB-Parameter-GuaranteedBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
GuaranteedBitrate

Ass-RAB-Parameter-MaxBitrateList ::= SEQUENCE (SIZE (1..maxNrOfSeparateTrafficDirections)) OF
MaxBitrate

AuthorisedPLMNs ::= SEQUENCE (SIZE (1..maxNrOfPLMNsSN)) OF
SEQUENCE {
    pLMNidentity        PLMNidentity,
    authorisedSNAsList  AuthorisedSNAs        OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {AuthorisedPLMNs-ExtIEs} } OPTIONAL,
    ...
}

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

AuthorisedSNAs ::= SEQUENCE (SIZE (1..maxNrOfSNAs)) OF SNAC

-- B

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

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

-- C

Cause ::= CHOICE {
    radioNetwork          CauseRadioNetwork,
    transmissionNetwork   CauseTransmissionNetwork,
    nAS                   CauseNAS,
    protocol              CauseProtocol,
    misc                  CauseMisc,
    non-Standard          CauseNon-Standard,
    ...
}

CauseMisc ::= INTEGER {
    om-intervention (113),
    no-resource-available (114),
    unspecified-failure (115),
    network-optimisation (116)
} (113..128)

CauseNAS ::= INTEGER {
    user-restriction-start-indication (81),
    user-restriction-end-indication (82),
}

```

```
    normal-release (83)
} (81..96)

CauseProtocol ::= INTEGER {
    transfer-syntax-error (97),
    semantic-error (98),
    message-not-compatible-with-receiver-state (99),
    abstract-syntax-error-reject (100),
    abstract-syntax-error-ignore-and-notify (101),
    abstract-syntax-error-falsely-constructed-message (102)
} (97..112)

CauseRadioNetwork ::= INTEGER {
    rab-pre-empted (1),
    trelocoverall-expiry (2),
    trelocprep-expiry (3),
    treloccomplete-expiry (4),
    tqueing-expiry (5),
    relocation-triggered (6),
    trellocalloc-expiry(7),
    unable-to-establish-during-relocation (8),
    unknown-target-rnc (9),
    relocation-cancelled (10),
    successful-relocation (11),
    requested-ciphering-and-or-integrity-protection-algorithms-not-supported (12),
    conflict-with-already-existing-integrity-protection-and-or-ciphering-information (13),
    failure-in-the-radio-interface-procedure (14),
    release-due-to-utran-generated-reason (15),
    user-inactivity (16),
    time-critical-relocation (17),
    requested-traffic-class-not-available (18),
    invalid-rab-parameters-value (19),
    requested-maximum-bit-rate-not-available (20),
    requested-guaranteed-bit-rate-not-available (21),
    requested-transfer-delay-not-achievable (22),
    invalid-rab-parameters-combination (23),
    condition-violation-for-sdu-parameters (24),
    condition-violation-for-traffic-handling-priority (25),
    condition-violation-for-guaranteed-bit-rate (26),
    user-plane-versions-not-supported (27),
    iu-up-failure (28),
    relocation-failure-in-target-CN-RNC-or-target-system(29),
    invalid-RAB-ID (30),
    no-remaining-rab (31),
    interaction-with-other-procedure (32),
    requested-maximum-bit-rate-for-dl-not-available (33),
    requested-maximum-bit-rate-for-ul-not-available (34),
    requested-guaranteed-bit-rate-for-dl-not-available (35),
    requested-guaranteed-bit-rate-for-ul-not-available (36),
    repeated-integrity-checking-failure (37),
    requested-request-type-not-supported (38),
    request-superseded (39),
    release-due-to-UE-generated-signalling-connection-release (40),
    resource-optimisation-relocation (41),
    requested-information-not-available (42),
    relocation-desirable-for-radio-reasons (43),
    relocation-not-supported-in-target-RNC-or-target-system (44),
    directed-retry (45),
    radio-connection-with-UE-Lost (46),
    rNC-unable-to-establish-all-RFCs (47),
    deciphering-keys-not-available(48),
    dedicated-assistance-data-not-available(49),
    relocation-target-not-allowed (50),
    location-reporting-congestion (51),
    reduce-load-in-serving-cell (52),
    no-radio-resources-available-in-target-cell (53),
    gERAN-Iumode-failure (54),
    access-restricted-due-to-shared-networks (55),
    incoming-relocation-not-supported-due-to-PUESBINE-feature (56),
    traffic-load-in-the-target-cell-higher-than-in-the-source-cell (57)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)
-- Cause value 256 shall not be used --

CauseTransmissionNetwork ::= INTEGER {
    signalling-transport-resource-failure (65),
```

```
iu-transport-connection-failed-to-establish (66)  
} (65..80)
```

**This Subclause continues. No more Changes.**