Technical Specification Group Radio Access Network

Marco Island, USA 4 - 7 June 2002

RP#16(02) 0401

TSG_Doc_Num	Specification	CR_Num	Revision_Num	3G_Release	CR_Subject	CR_Category	Cur_Ver_Num	New_Ver_Num	Tdoc_Num	WorkItem
RP-020401	25.413	412	3	R99	Criticality Information Decoding Failure Handling	F	3.9.0	3.10.0	R3-021184	TEI
RP-020401	25.413	413	3	Rel-4	Criticality Information Decoding Failure Handling	A	4.4.0	4.5.0	R3-021183	TEI
RP-020401	25.413	415	4	R99	SDU Format Information Presence	F	3.9.0	3.10.0	R3-021461	TEI
RP-020401	25.413	416	4	Rel-4	SDU Format Information Presence	A	4.4.0	4.5.0	R3-021462	TEI
RP-020401	25.413	437		Rel-5	Criticality Information Decoding Failure Handling	A	5.0.0	5.1.0	R3-021182	TEI
RP-020401	25.413	438	2	R99	Erroneous Security Mode Control procedure	F	3.9.0	3.10.0	R3-021649	TEI
RP-020401	25.413	439	2	Rel-4	Erroneous Security Mode Control procedure	A	4.4.0	4.5.0	R3-021650	TEI
RP-020401	25.413	440	2	Rel-5	Erroneous Security Mode Control procedure	A	5.0.0	5.1.0	R3-021651	TEI
RP-020401	25.413	444	1	Rel-5	SDU Format Information Presence	A	5.0.0	5.1.0	R3-021463	TEI
RP-020401	25.413	449		R99	"EXTENSION INDICATION" PROPOSAL	F	3.9.0	3.10.0	R3-021304	TEI
RP-020401	25.413	450		Rel-4	"EXTENSION INDICATION" PROPOSAL	A	4.4.0	4.5.0	R3-021305	TEI
RP-020401	25.413	451		Rel-5	"EXTENSION INDICATION" PROPOSAL	A	5.0.0	5.1.0	R3-021306	TEI
RP-020401	25.413	460	1	R99	RNL-TNL coordination in RANAP	F	3.9.0	3.10.0	R3-021529	TEI
RP-020401	25.413	461	1	Rel-4	RNL-TNL coordination in RANAP	A	4.4.0	4.5.0	R3-021530	TEI
RP-020401	25.413	462	1	Rel-5	RNL-TNL coordination in RANAP	A	5.0.0	5.1.0	R3-021531	TEI

RP-020401	25.413	463	2	R99	Correction of RNC Iu Coordinated relocation	F	3.9.0	3.10.0	R3-021540	TEI
RP-020401	25.413	464	2	Rel-4	Correction of RNC Iu Coordinated relocation	A	4.4.0	4.5.0	R3-021541	TEI
RP-020401	25.413	465	2	Rel-5	Correction of RNC Iu Coordinated relocation	A	5.0.0	5.1.0	R3-021542	TEI
RP-020401	25.413	467	1	R99	Clarification for the usage of the cause value	F	3.9.0	3.10.0	R3-021496	TEI
RP-020401	25.413	468	1	Rel-4	Clarification for the usage of the cause value	A	4.4.0	4.5.0	R3-021497	TEI
RP-020401	25.413	469	1	Rel-5	Clarification for the usage of the cause value	A	5.0.0	5.1.0	R3-021498	TEI
RP-020401	25.413	441		R99	Correction of Target RNC-ID	F	3.9.0	3.10.0	R3-021197	TEI
RP-020401	25.413	442		Rel-4	Correction of Target RNC-ID	A	4.4.0	4.5.0	R3-021198	TEI
RP-020401	25.413	443		Rel-5	Correction of Target RNC-ID	A	5.0.0	5.1.0	R3-021199	TEI

CR-Form-v5

CHANGE REQUEST

⌘ **25.413** CR **412** ⌘ **rev** **3** ⌘ Current version: **3.9.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Criticality Information Decoding Failure Handling	
Source: ⌘	R-WG3	
Work item code: ⌘ TEI		***Date:*** ⌘ May, 2002

Category: ⌘ **F**   ***Release:*** ⌘ R99

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

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change: ⌘	Section 10.3.2 specifies that "when the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value". As all decoding errors result in an Error Indication procedure being sent with a cause value of Transfer Syntax error as specified in section 10.2, this specification statement is not required and causes confusion.
Summary of change: ⌘	The above-mentioned specification statement in section 10.3.2 is removed. <u>Impact analysis</u> Impact assessment towards the previous version of the specification (same release): The CR has isolated impact with the previous version of the specification (same release). The impact can be considered isolated because the change affects one (or more) system function(s), namely the error handling function and has the possibility to affect existing implementations even though the change is functional and protocol compatible.
Consequences if not approved: ⌘	The specification statement seems to indicate that when the criticality information cannot be decoded, it needs to be handled in a different way from handling Transfer Syntax protocol error. If not approved, this ambiguity will persist.

Clauses affected: ⌘	10.3.2	
Other specs ⌘	**X** Other core specifications ⌘	25.413 R4 CR 413, 25.413 R5 CR 437, 25.419 R99 CR 095, 25.419 R4 CR 096, 25.419 R5 CR 097, 25.423 R99 CR 590, 25.423 R4 CR 591, 25.423 R5 CR 599, 25.433 R99 CR 630, 25.433 R4 CR 631, 25.433 R5 CR 633, 25.453 R5 CR 017
affected:	☐ Test specifications	None.

	O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:

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

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

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

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

- Wrong order of elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

10.3 Abstract Syntax Error

10.3.1 General

An Abstract Syntax Error occurs when the receiving functional RANAP entity:

1. receives IEs or IE groups that cannot be understood (unknown IE ID);

2. receives IEs for which the logical range is violated (e.g.: ASN.1 definition: 0 to 15, the logical range is 0 to 10 (values 11 to 15 are undefined), and 12 will be received; this case will be handled as an abstract syntax error using criticality information sent by the originator of the message);

3. does not receive IEs or IE groups but according to the specified presence of the concerning object, the IEs or IE groups should have been present in the received message.

4. receives IEs or IE groups that are defined to be part of that message in wrong order or with too many occurrences of the same IE or IE group;

5. receives IEs or IE groups but according to the conditional presence of the concerning object and the specified condition, the IEs or IE groups should not have been present in the received message.

Cases 1 and 2 (not comprehended IE/IE group) are handled based on received Criticality information. Case 3 (missing IE/IE group) is handled based on Criticality information and Presence information for the missing IE/IE group specified in the version of the specification used by the receiver. Case 4 (IEs or IE groups in wrong order or with too many occurrences) and Case 5 (erroneously present conditional IEs or IE groups) result in rejecting the procedure.

If an Abstract Syntax Error occurs, the receiver shall read the remaining message and shall then for each detected Abstract Syntax Error that belong to cases 1-3 act according to the Criticality Information and Presence Information for the IE/IE group due to which Abstract Syntax Error occurred in accordance with subclauses 10.3.4 and 10.3.5. The handling of cases 4 and 5 is specified in subclause 10.3.6.

10.3.2 Criticality Information

In the RANAP messages there is criticality information set for individual IEs and/or IE groups. This criticality information instructs the receiver how to act when receiving an IE or an IE group that is not comprehended, i.e. the entire item (IE or IE group) which is not (fully or partially) comprehended shall be treated in accordance with its own criticality information as specified in subclause 10.3.4.

In addition, the criticality information is used in case of the missing IE/IE group abstract syntax error (see subclause 10.3.5).

The receiving node shall take different actions depending on the value of the Criticality Information. The three possible values of the Criticality Information for an IE/IE group are:

- Reject IE.

- Ignore IE and Notify Sender.

- Ignore IE.

The following rules restrict when a receiving entity may consider an IE, an IE group, or an EP not comprehended (not implemented), and when action based on criticality information is applicable:

1. IE or IE group: When one new or modified IE or IE group is implemented for one EP from a standard version, then other new or modified IEs or IE groups specified for that EP in that standard version shall be considered comprehended by a receiving entity (some may still remain unsupported).

   Note that this restriction is not applicable to a sending entity for constructing messages.

2. EP: The comprehension of different EPs within a standard version or between different standard versions is not mandated. Any EP that is not supported may be considered not comprehended, even if another EP from that standard version is comprehended, and action based on criticality shall be applied.

~~When the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value.~~

10.3.3 Presence Information

For many IEs/IE groups which are optional according to the ASN.1 transfer syntax, RANAP specifies separately if the presence of these IEs/IE groups is optional or mandatory with respect to RNS application by means of the presence field of the concerning object of class RANAP-PROTOCOL-IES, RANAP-PROTOCOL-IES-PAIR, RANAP-PROTOCOL-EXTENSION or RANAP-PRIVATE-IES.

The presence field of the indicated classes supports three values:

1. Optional;

2. Conditional;

3. Mandatory.

If an IE/IE group is not included in a received message and the presence of the IE/IE group is mandatory or the presence is conditional and the condition is true according to the version of the specification used by the receiver, an abstract syntax error occurs due to a missing IE/IE group.

If an IE/IE group is included in a received message and the presence of the IE/IE group is conditional and the condition is false according to the version of the specification used by the receiver, an abstract syntax error occurs due to this erroneously present conditional IE/IE group.

10.3.4 Not comprehended IE/IE group

10.3.4.1 Procedure Code

The receiving node shall treat the different types of received criticality information of the *Procedure Code* IE according to the following:

Reject IE:

- If a message is received with a *Procedure Code* IE marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall reject the procedure using the Error Indication procedure.

Ignore IE and Notify Sender:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the procedure and initiate the Error Indication procedure.

Ignore IE:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the procedure.

When using the Error Indication procedure to reject a procedure or to report an ignored procedure it shall include the *Procedure Code* IE, the *Triggering Message* IE, and the *Procedure Criticality* IE in the *Criticality Diagnostics* IE.

10.3.4.1A Type of Message

When the receiving node cannot decode the *Type of Message* IE, the Error Indication procedure shall be initiated with an appropriate cause value.

CR-Form-v5

CHANGE REQUEST

⌘	**25.413 CR 413**	⌘ **rev**	**3**	⌘	Current version:	**4.4.0**	⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Criticality Information Decoding Failure Handling	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ May, 2002

Category: ⌘ **A**		***Release:*** ⌘ REL-4	
Use one of the following categories:		*Use one of the following releases:*	
F *(correction)*		*2*	*(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*		*R96*	*(Release 1996)*
B *(addition of feature),*		*R97*	*(Release 1997)*
C *(functional modification of feature)*		*R98*	*(Release 1998)*
D *(editorial modification)*		*R99*	*(Release 1999)*
Detailed explanations of the above categories can		*REL-4*	*(Release 4)*
be found in 3GPP TR 21.900.		*REL-5*	*(Release 5)*

Reason for change: ⌘	Section 10.3.2 specifies that "when the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value". As all decoding errors result in an Error Indication procedure being sent with a cause value of Transfer Syntax error as specified in section 10.2, this specification statement is not required and causes confusion.
Summary of change: ⌘	The above-mentioned specification statement in section 10.3.2 is removed. <u>Impact analysis</u> Impact assessment towards the previous version of the specification (same release): The CR has isolated impact with the previous version of the specification (same release). The impact can be considered isolated because the change affects one (or more) system function(s), namely the error handling function and has the possibility to affect existing implementations even though the change is functional and protocol compatible.
Consequences if not approved: ⌘	The specification statement seems to indicate that when the criticality information cannot be decoded, it needs to be handled in a different way from handling Transfer Syntax protocol error. If not approved, this ambiguity will persist.

Clauses affected: ⌘	10.3.2

Other specs ⌘	**X**	Other core specifications ⌘	25.413 R99 CR 412, 25.413 R5 CR 437, 25.419 R99 CR 095, 25.419 R4 CR 096, 25.419 R5 CR 097, 25.423 R99 CR 590, 25.423 R4 CR 591, 25.423 R5 CR 599, 25.433 R99 CR 630, 25.433 R4 CR 631, 25.433 R5 CR 633, 25.453 R5 CR 017
affected:		Test specifications	None.

	O&M Specifications	

Other comments: ⌘		

How to create CRs using this form:

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

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

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

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

-    Wrong order of elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

10.3   Abstract Syntax Error

10.3.1   General

An Abstract Syntax Error occurs when the receiving functional RANAP entity:

1.   receives IEs or IE groups that cannot be understood (unknown IE ID);

2.   receives IEs for which the logical range is violated (e.g.: ASN.1 definition: 0 to 15, the logical range is 0 to 10 (values 11 to 15 are undefined), and 12 will be received; this case will be handled as an abstract syntax error using criticality information sent by the originator of the message);

3.   does not receive IEs or IE groups but according to the specified presence of the concerning object, the IEs or IE groups should have been present in the received message.

4.   receives IEs or IE groups that are defined to be part of that message in wrong order or with too many occurrences of the same IE or IE group;

5.   receives IEs or IE groups but according to the conditional presence of the concerning object and the specified condition, the IEs or IE groups should not have been present in the received message.

Cases 1 and 2 (not comprehended IE/IE group) are handled based on received Criticality information. Case 3 (missing IE/IE group) is handled based on Criticality information and Presence information for the missing IE/IE group specified in the version of the specification used by the receiver. Case 4 (IEs or IE groups in wrong order or with too many occurrences) and Case 5 (erroneously present conditional IEs or IE groups) result in rejecting the procedure.

If an Abstract Syntax Error occurs, the receiver shall read the remaining message and shall then for each detected Abstract Syntax Error that belong to cases 1-3 act according to the Criticality Information and Presence Information for the IE/IE group due to which Abstract Syntax Error occurred in accordance with subclauses 10.3.4 and 10.3.5. The handling of cases 4 and 5 is specified in subclause 10.3.6.

10.3.2   Criticality Information

In the RANAP messages there is criticality information set for individual IEs and/or IE groups. This criticality information instructs the receiver how to act when receiving an IE or an IE group that is not comprehended, i.e. the entire item (IE or IE group) which is not (fully or partially) comprehended shall be treated in accordance with its own criticality information as specified in subclause 10.3.4.

In addition, the criticality information is used in case of the missing IE/IE group abstract syntax error (see subclause 10.3.5).

The receiving node shall take different actions depending on the value of the Criticality Information. The three possible values of the Criticality Information for an IE/IE group are:

-    Reject IE.

-    Ignore IE and Notify Sender.

-    Ignore IE.

The following rules restrict when a receiving entity may consider an IE, an IE group, or an EP not comprehended (not implemented), and when action based on criticality information is applicable:

1.   IE or IE group: When one new or modified IE or IE group is implemented for one EP from a standard version, then other new or modified IEs or IE groups specified for that EP in that standard version shall be considered comprehended by a receiving entity (some may still remain unsupported).

     Note that this restriction is not applicable to a sending entity for constructing messages.

2. EP: The comprehension of different EPs within a standard version or between different standard versions is not mandated. Any EP that is not supported may be considered not comprehended, even if another EP from that standard version is comprehended, and action based on criticality shall be applied.

~~When the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value.~~

10.3.3 Presence Information

For many IEs/IE groups which are optional according to the ASN.1 transfer syntax, RANAP specifies separately if the presence of these IEs/IE groups is optional or mandatory with respect to RNS application by means of the presence field of the concerning object of class RANAP-PROTOCOL-IES, RANAP-PROTOCOL-IES-PAIR, RANAP-PROTOCOL-EXTENSION or RANAP-PRIVATE-IES.

The presence field of the indicated classes supports three values:

1. Optional;

2. Conditional;

3. Mandatory.

If an IE/IE group is not included in a received message and the presence of the IE/IE group is mandatory or the presence is conditional and the condition is true according to the version of the specification used by the receiver, an abstract syntax error occurs due to a missing IE/IE group.

If an IE/IE group is included in a received message and the presence of the IE/IE group is conditional and the condition is false according to the version of the specification used by the receiver, an abstract syntax error occurs due to this erroneously present conditional IE/IE group.

10.3.4 Not comprehended IE/IE group

10.3.4.1 Procedure Code

The receiving node shall treat the different types of received criticality information of the *Procedure Code* IE according to the following:

Reject IE:

- If a message is received with a *Procedure Code* IE marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall reject the procedure using the Error Indication procedure.

Ignore IE and Notify Sender:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the procedure and initiate the Error Indication procedure.

Ignore IE:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the procedure.

When using the Error Indication procedure to reject a procedure or to report an ignored procedure it shall include the *Procedure Code* IE, the *Triggering Message* IE, and the *Procedure Criticality* IE in the *Criticality Diagnostics* IE.

10.3.4.1A Type of Message

When the receiving node cannot decode the *Type of Message* IE, the Error Indication procedure shall be initiated with an appropriate cause value.

CR-Form-v5

CHANGE REQUEST

⌘ **25.413** CR **415** ⌘rev **4** ⌘ Current version: **3.9.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	SDU Format Information Presence
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ May, 2002

Category:	⌘ **F**	***Release:*** ⌘ R99

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

Use <u>one</u> of the following releases:
  2   *(GSM Phase 2)*
  R96   *(Release 1996)*
  R97   *(Release 1997)*
  R98   *(Release 1998)*
  R99   *(Release 1999)*
  REL-4   *(Release 4)*
  REL-5   *(Release 5)*

Reason for change: ⌘	Current definition for the presence of *SDU Format Information Parameter* IE in the *SDU Parameters* IE is defined as "present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'". The User Plane Mode information may not be available in the RAB ASSIGNMENT REQUEST message for a RAB modification, so the RAN3 error handling mechanisms would not be able to properly determine presence for the *SDU Format Information Parameter* IE based solely on the received message. The IEs contained in the *SDU Format Information Parameter* IE are the *Subflow SDU Size* IE and *RAB Subflow Combination Bit Rate* IE. This would imply that this information is applicable for all traffic classes. However, in TS 23.107 the SDU Format Information Parameter is not marked as relevant for the Interactive and Background traffic classes in the sections discussing these attributes (6.4.3.2 & 6.4.3.3). Since these attributes are not relevant for the Interactive and Background traffic classes it would not be appropriate to allow this combination in the RAB parameters. There is no definition for how these attributes should be used for the Interactive and Background traffic classes.
Summary of change: ⌘	The condition for the presence of the SDU Format Information Parameter IE should be changed to optional with text added to the procedure sections indicating when the IE should be included. The IE should be present for RABs with User Plane Mode set to 'support mode for predefined SDU sizes' and whose traffic class is either 'Conversational' or 'Streaming'. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release) because the presence of the SDU Format Information Parameter IE could not be determined previously from the received message only if the User

		Plane Mode information was not also included in the received message. It could also be misunderstood that the SDU Format Information Parameter IE was applicable for all traffic classes. This CR has an impact under a functional point of view.
Consequences if not approved:	⌘	There would be a misalignment for relevant attributes between TS 23.107 and TS 25.413. Additional unintended functional support for RAB parameter combinations not described by the Stage 2 specification (TS 23.107) would be expected but not defined. User Plane support for multiple subflow SDU sizes for unintended traffic classes would be needed. The RAN3 error handling mechanisms cannot determine the presence of the IE based on the received message only.

Clauses affected:	⌘	8.2.2, 8.7.2, 9.2.1.3, 9.3.4

Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.413 R4 CR 416, 25.413 R5 CR 444 None.

Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

Table 3: Class 3

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

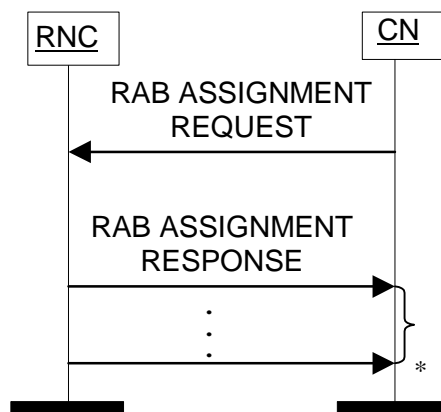The following applies concerning interference between Elementary Procedures:

- The Reset procedure takes precedence over all other EPs.

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

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

8.2 RAB Assignment

8.2.1 General

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

8.2.2 Successful Operation

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i e User Plane Mode and UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS)

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information.

- User Plane Information.

The *Transport Layer Information* IE may be present at a RAB modification except in the case when the only other present IE, besides the RAB ID IE, is the *NAS Synchronisation Indicator* IE.

At a RAB modification, the *RAB Pparameters* IE ~~and the *User Plane Information* IE~~ shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value <u>for this IE</u> is requested to be modified.

<u>At a RAB modification, the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value for this IE is requested to be modified.</u>

<u>For a RAB setup, 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".</u>

<u>If the *RAB Parameters* IE is present for a RAB modification, the *SDU Format Information Parameter* IE in the *RAB Parameters* IE shall be present only if the *Traffic Class* IE is set to either "Conversational" or "Streaming" and if</u>

   <u>- either the User Plane mode is currently "support mode for pre-defined SDU sizes" and the *User Plane Mode* IE is not contained in the RAB ASSIGNMENT REQUEST message</u>

   <u>- or if the *User Plane Mode* IE optionally contained within the RAB ASSIGNMENT REQUEST message is set to "support mode for pre-defined SDU sizes".</u>

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

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

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

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

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB:

- setup/modified or;

- released or;

- queued or;

- failed to setup/modify or;

- failed to release.

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

If no Transport Layer Information was included in the RAB ASSIGNMENT REQUEST message at a RAB modification, no transport network control plane signalling shall occur.

For each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

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

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer $T_{QUEUING}$.

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

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

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

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

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

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

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

The RNC shall be prepared to receive a RAB ASSIGNMENT REQUEST message containing a *RABs To Be Released* IE at any time and shall always reply to it. If there is an ongoing RAB Assignment procedure for a RAB indicated

within the *RABs To Be Released* IE, the RNC shall discard the preceding RAB Assignment procedure for that specific RAB, release any related resources and report the released RAB within the RAB ASSIGNMENT RESPONSE message.

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID.

8.2.3 Unsuccessful Operation

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

8.2.4 Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

-   *PDP Type Information*.

-   *Data Volume Reporting Indication*.

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

    -   for all queued RABs;

    -   for RABs not already established or modified, and

    -   for RABs not already released;

    with the cause "Relocation triggered".

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

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

    -   for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

8.7 Relocation Resource Allocation

8.7.1 General

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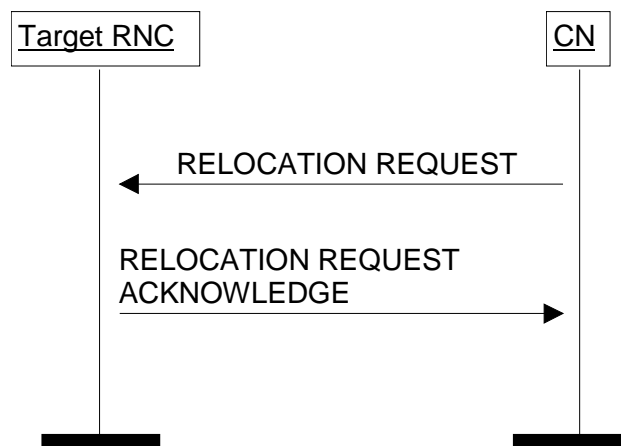
8.7.2 Successful Operation

Figure 7: Relocation Resource Allocation procedure. Successful operation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information*

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

- *Service Handover*

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- RAB-ID

- User plane Information

- Priority level, queuing and pre-emption indication

- Service Handover

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

- *Transport Layer Address* (only for PS)

- *Iu Transport Association* (only for PS)

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE. This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

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

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

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

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

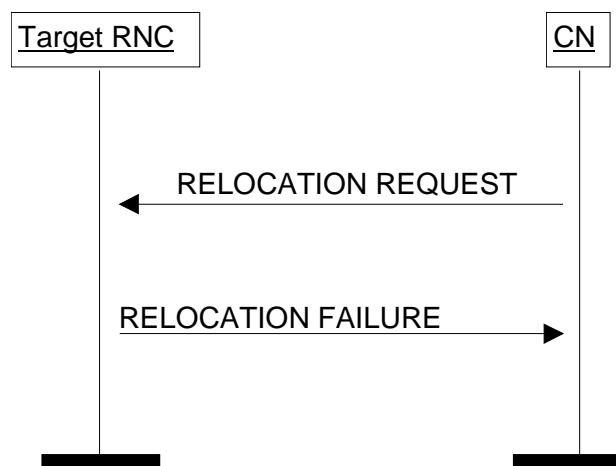## 8.7.3 Unsuccessful Operation

Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

8.7.4 Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5 Co-ordination of Two Iu Signalling Connections

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

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

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

9.2.1.3 RAB Parameters

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Traffic Class	M		ENUMERATED (conversational, streaming, interactive, background, ...)	**Desc.:** This IE indicates the type of application for which the Radio Access Bearer service is optimised
>RAB Asymmetry Indicator	M		ENUMERATED (Symmetric bidirectional, Asymmetric Uni directional downlink, Asymmetric Uni directional Uplink, Asymmetric Bidirectional, ...)	**Desc.:** This IE indicates asymmetry or symmetry of the RAB and traffic direction
>Maximum Bit Rate	M	1 to <nbr-SeparateTrafficDir ections>	INTEGER (1..16,000,000)	**Desc.:** This IE indicates the maximum number of bits delivered by UTRAN and to UTRAN at a SAP within a period of time, divided by the duration of the period. The unit is: bit/s **Usage**: When nbr-SeparateTrafficDirections is equal to 2, then Maximum Bit Rate attribute for downlink is signalled first, then Maximum Bit Rate attribute for uplink
>Guaranteed Bit Rate	C-iftrafficConv-Stream	0 to <nbr-SeparateTrafficDir ections>	INTEGER (0..16,000,000)	**Desc.:** This IE indicates the guaranteed number of bits delivered at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The unit is: bit/s **Usage:** 1. When nbr-SeparateTrafficDirections is equal to 2, then Guaranteed Bit Rate for downlink is signalled first, then Guaranteed Bit Rate for uplink 2. Delay and reliability attributes only apply up to the guaranteed bit rate 3. Conditional value for the case of Support Mode for pre-defined SDU sizes: Set to highest not rate controllable bitrate, where bitrate is either – one of the RAB subflow combination bitrate IEs (when present) or – one of the calculated values given when dividing

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
				the compound Subflow combination SDU sizes by the value of the IE Maximum SDU Size and then multiplying this result by the value of the IE Maximum Bit Rate.
>Delivery Order	M		ENUMERATED (delivery order requested, delivery order not requested)	**Desc:** This IE indicates whether the RAB shall provide in-sequence SDU delivery or not **Usage:** Delivery order requested: in sequence delivery shall be guaranteed by UTRAN on all RAB SDUs Delivery order not requested: in sequence delivery is not required from UTRAN
>Maximum SDU Size	M		INTEGER (0..32768)	**Desc.:** This IE indicates the maximum allowed SDU size The unit is: bit. **Usage:** Conditional value: Set to largest RAB Subflow Combination compound SDU size (when present) among the different RAB Subflow Combinations
> SDU parameters		1 to \<maxRABSubflows>	See below	**Desc.:** This IE contains the parameters characterizing the RAB SDUs **Usage** Given per subflow with first occurence corresponding to subflow#1 etc…
>Transfer Delay	C-iftrafficConv-Stream		INTEGER (0..65535)	**Desc.:** This IE indicates the maximum delay for 95th percentile of the distribution of delay for all delivered SDUs during the lifetime of a RAB, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP The unit is: millisecond. **Usage:** **-**
>Traffic Handling Priority	C -iftrafficInteractiv		INTEGER {spare (0), highest (1), .., lowest (14), no priority (15)} (0..15)	**Desc.:** This IE specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers **Usage:** Values between 1 and 14 are ordered in decreasing order of priority, '1' being the highest and '14' the lowest. Value 0 shall be treated as a logical error if received.
>Allocation/Retention priority	O		See below	**Desc.:** This IE specifies the relative importance compared to other Radio access bearers for allocation and retention of the Radio access bearer. **Usage:** If this IE is not received, the request is regarded as it cannot trigger the pre-emption process and it is vulnerable to the pre-emption process.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Source Statistics Descriptor	C-iftrafficConv-Stream		ENUMERATED (speech, unknown, …)	**Desc.:** This IE specifies characteristics of the source of submitted SDUs **Usage:** -
>Relocation Requirement	O		ENUMERATED (lossless, none, …)	This IE shall be present for RABs towards the PS domain, otherwise it shall not be present. **Desc.:** This IE is no longer used. **Usage:** It shall always be set to "none" when sent and it shall always be ignored when received.

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

Range Bound	Explanation
maxRABSubflows	Maximum number of Subflows per RAB. Value is 7

Condition	Explanation
IftrafficConv-Stream	This IE shall be present if the *Traffic Class* IE is set to "Conversational" or "Streaming".
IftrafficInteractiv	This IE shall be present if the *Traffic Class* IE is set to "Interactive".

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SDU parameters				
> SDU Error Ratio	C-ifErroneousSDU			**Desc.:** This IE indicates the fraction of SDUs lost or detected as erroneous. This is a Reliability attribute **Usage:** The attribute is coded as follows: Mantissa * $10^{-exponent}$
>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..6)	
>Residual Bit Error Ratio	M			**Desc.:** This IE indicates the undetected bit error ratio for each subflow in the delivered SDU. This is a Reliability attribute. **Usage:** The attribute is coded as follows: Mantissa * $10^{-exponent}$

>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..8)	
>Delivery Of Erroneous SDU	M		ENUMERATED (yes, no, no-error-detection-consideration)	**Desc.:** This IE indicates whether SDUs with detected errors shall be delivered or not. In case of unequal error protection, the attribute is set per subflow This is a Reliability attribute **Usage:** Yes: error detection applied, erroneous SDU delivered No. Error detection is applied, erroneous SDU discarded no-error-detection-consideration: SDUs delivered without considering error detection If the RNC receives this IE set to 'Yes' and the *User Plane Mode* IE is set to 'transparent mode', it should consider it as 'no-error-detection-consideration'.
>SDU format information Parameter	~~C - IfSMPredefinedSDUSize~~O	1 to \<maxRABSubflow Combinations>	See below	**Desc.:** This IE contains the list of possible exact sizes of SDUs and/or RAB Subflow Combination bit rates. Given per RAB Subflow Combination with first occurence corresponding to RAB Subflow Combination number 1. It shall always be present for rate controllable RABs.

Range Bound	Explanation
maxRABSubflowCombinations	Maximum number of RAB Subflow Combinations. Value is 64.

Condition	Explanation
IfErroneousSDU	This IE shall be present if the *Delivery Of Erroneous SDU* IE is set to "Yes" or "No".
~~IfSMPredefinedSDUSize~~	~~This IE shall be present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'.~~

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

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

9.2.1.4 Cause

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

9.3.4   Information Element Definitions

```
    allocationOrRetentionPriority    AllocationOrRetentionPriority OPTIONAL,
    sourceStatisticsDescriptor    SourceStatisticsDescriptor OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Conversational" or "Streaming"--,
    relocationRequirement    RelocationRequirement OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

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

RAB-SubflowCombinationBitRate    ::= INTEGER (0..16000000)

RAB-TrCH-Mapping ::=    SEQUENCE ( SIZE (1..maxNrOfRABs)) OF
    RAB-TrCH-MappingItem

RAB-TrCH-MappingItem ::= SEQUENCE {
    rAB-ID          RAB-ID,
    trCH-ID-List    TrCH-ID-List,
    ...
}

RAC                ::= OCTET STRING (SIZE (1))

RAI ::= SEQUENCE {
    lAI             LAI,
    rAC             RAC,
    iE-Extensions            ProtocolExtensionContainer { {RAI-ExtIEs} } OPTIONAL,
    ...
}

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

RateControlAllowed ::= ENUMERATED {
    not-allowed,
    allowed
}

RelocationRequirement ::= ENUMERATED {
    lossless,
    none,
    ...
}
```

```
RelocationType ::= ENUMERATED {
    ue-not-involved,
    ue-involved,
    ...
}

RepetitionNumber0 ::= INTEGER (0..255)


RepetitionNumber1 ::= INTEGER (1..256)


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

RequestType ::= SEQUENCE {
    event             Event,
    reportArea        ReportArea,
    accuracyCode      INTEGER (0..127)   OPTIONAL,   ...
}

ResidualBitErrorRatio ::= SEQUENCE {
    mantissa          INTEGER (1..9),
    exponent          INTEGER (1..8),
    iE-Extensions             ProtocolExtensionContainer { {ResidualBitErrorRatio-ExtIEs} } OPTIONAL
}
-- ResidualBitErrorRatio = mantissa * 10^-exponent

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

RNC-ID                 ::= INTEGER (0..4095)
-- RNC-ID                 ::= BIT STRING (SIZE (12))
-- Harmonized with RNSAP and NBAP definitions

RRC-Container              ::= OCTET STRING


-- S

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

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

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

```
SAPI ::= ENUMERATED {
    sapi-0,
    sapi-3,
    ...
}

SDU-ErrorRatio ::= SEQUENCE {
    mantissa             INTEGER (1..9),
    exponent             INTEGER (1..6),
    iE-Extensions             ProtocolExtensionContainer { {SDU-ErrorRatio-ExtIEs} } OPTIONAL
}
-- SDU-ErrorRatio = mantissa * 10^-exponent

SDU-ErrorRatio-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
SDU-FormatInformationParameters ::= SEQUENCE (SIZE (1..maxRAB-SubflowCombination)) OF
    SEQUENCE {
        subflowSDU-Size          SubflowSDU-Size     OPTIONAL,
        rAB-SubflowCombinationBitRate    RAB-SubflowCombinationBitRate    OPTIONAL,
        iE-Extensions             ProtocolExtensionContainer { {SDU-FormatInformationParameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-FormatInformationParameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SDU-Parameters ::= SEQUENCE (SIZE (1..maxRAB-Subflows)) OF
    SEQUENCE {
        sDU-ErrorRatio          SDU-ErrorRatio OPTIONAL
        -- This IE shall be present if the Delivery Of Erroneous SDU IE is set to "Yes" or "No"--,
        residualBitErrorRatio        ResidualBitErrorRatio,
        deliveryOfErroneousSDU        DeliveryOfErroneousSDU,
        sDU-FormatInformationParameters SDU-FormatInformationParameters OPTIONAL
        -- This IE shall be present for RABs with the IE User Plane Mode set to support mode for predefined SDU sizes --,
        iE-Extensions             ProtocolExtensionContainer { {SDU-Parameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Service-Handover ::= ENUMERATED {
    handover-to-GSM-should-be-performed,
    handover-to-GSM-should-not-be-performed,
    handover-to-GSM-shall-not-be-performed,
    ...
}
```

CR-Form-v5

CHANGE REQUEST

⌘   **25.413** CR **416**   ⌘**rev** **4** ⌘ Current version: **4.4.0** ⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	SDU Format Information Presence
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ May, 2002
Category:	⌘ **A**	***Release:*** ⌘ REL-4

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

Use <u>one</u> of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4 *(Release 4)*
   REL-5 *(Release 5)*

Reason for change: ⌘	Current definition for the presence of *SDU Format Information Parameter* IE in the *SDU Parameters* IE is defined as "present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'". The User Plane Mode information may not be available in the RAB ASSIGNMENT REQUEST message for a RAB modification, so the RAN3 error handling mechanisms would not be able to properly determine presence for the *SDU Format Information Parameter* IE based solely on the received message. The IEs contained in the *SDU Format Information Parameter* IE are the *Subflow SDU Size* IE and *RAB Subflow Combination Bit Rate* IE. This would imply that this information is applicable for all traffic classes. However, in TS 23.107 the SDU Format Information Parameter is not marked as relevant for the Interactive and Background traffic classes in the sections discussing these attributes (6.4.3.2 & 6.4.3.3). Since these attributes are not relevant for the Interactive and Background traffic classes it would not be appropriate to allow this combination in the RAB parameters. There is no definition for how these attributes should be used for the Interactive and Background traffic classes.
Summary of change: ⌘	The condition for the presence of the SDU Format Information Parameter IE should be changed to optional with text added to the procedure sections indicating when the IE should be included. The IE should be present for RABs with User Plane Mode set to 'support mode for predefined SDU sizes' and whose traffic class is either 'Conversational' or 'Streaming'. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release) because the presence of the SDU Format Information Parameter IE could not be determined previously from the received message only if the User

		Plane Mode information was not also included in the received message. It could also be misunderstood that the SDU Format Information Parameter IE was applicable for all traffic classes. This CR has an impact under a functional point of view.
Consequences if not approved:	⌘	There would be a misalignment for relevant attributes between TS 23.107 and TS 25.413. Additional unintended functional support for RAB parameter combinations not described by the Stage 2 specification (TS 23.107) would be expected but not defined. User Plane support for multiple subflow SDU sizes for unintended traffic classes would be needed. The RAN3 error handling mechanisms cannot determine the presence of the IE based on the received message only.

Clauses affected:	⌘	8.2.2, 8.7.2, 9.2.1.3, 9.3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.413 R99 CR 415, 25.413 R5 CR 444 None.
Other comments:	⌘			

How to create CRs using this form:

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

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

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

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

Table 3: Class 3

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

The following applies concerning interference between Elementary Procedures:
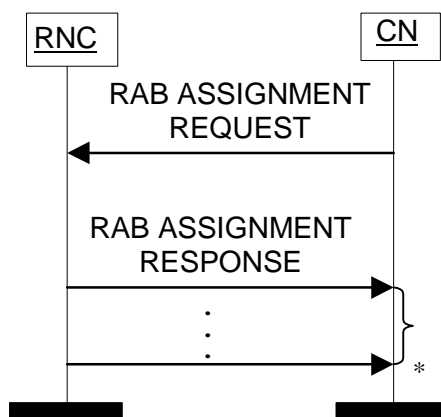
- The Reset procedure takes precedence over all other EPs.

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

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

8.2 RAB Assignment

8.2.1 General

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

8.2.2 Successful Operation

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i.e required User Plane Mode and required UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS)

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information.

- User Plane Information.

The *Transport Layer Information* IE may be present at a RAB modification except in the case when the only other present IE, besides the *RAB ID* IE, is the *NAS Synchronisation Indicator* IE.

At a RAB modification, the *RAB Pparameters* IE and the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value for this IE is requested to be modified.

At a RAB modification, the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value for this IE is requested to be modified.

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

If the *RAB Parameters* IE is present for a RAB modification, the *SDU Format Information Parameter* IE in the *RAB Parameters* IE shall be present only if the *Traffic Class* IE is set to either "Conversational" or "Streaming" and if

- either the User Plane mode is currently "support mode for pre-defined SDU sizes" and the *User Plane Mode* IE is not contained in the RAB ASSIGNMENT REQUEST message

- or if the *User Plane Mode* IE optionally contained within the RAB ASSIGNMENT REQUEST message is set to "support mode for pre-defined SDU sizes".

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

Upon reception of the RAB ASSIGNMENT REQUEST message UTRAN shall execute the requested RAB configuration. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

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

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB:

- setup/modified or

- released or

- queued or

- failed to setup/modify or

- failed to release.

If any alternative RAB parameter values have been used when establishing or modifying a RAB, these RAB parameter values shall be included in the RAB ASSIGNMENT RESPONSE message.

For the CS domain, UTRAN shall report the outcome of a specific RAB to establish or modify only after the transport network control plane signalling, which is needed for RAB establishment or modification, has been executed. At a RAB establishment, the transport network control plane signalling shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification, it is up to the RNC to decide if any transport network control plane signalling shall be performed or if the already existing transport bearer shall be used. If the RNC decides to establish a new transport bearer, the transport network control plane signalling shall use the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE. Then the switch over to this new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode. If the RNC decides to modify the already existing transport bearer, the transport network control plane signalling shall not use the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE. That is, re-binding with *Iu Transport Association* IE shall not be done.

For each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

Before reporting the successful outcome of a specific RAB to establish or modify, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. 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 Assignment shall fail with the cause value "RNC unable to establish all RFCs".

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer T$_{QUEUING}$.

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

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

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

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

When UTRAN reports unsuccessful establishment/modification of a RAB, the cause value should be precise enough to enable the core network to know the reason for unsuccessful establishment/modification. Typical cause values are: "Requested Traffic Class not Available", "Invalid RAB Parameters Value", "Requested Maximum Bit Rate not Available", "Requested Maximum Bit Rate for DL not Available", "Requested Maximum Bit Rate for UL not Available", "Requested Guaranteed Bit Rate not Available", "Requested Guaranteed Bit Rate for DL not Available", "Requested Guaranteed Bit Rate for UL not Available", "Requested Transfer Delay not Achievable", "Invalid RAB

Parameters Combination", "Condition Violation for SDU Parameters", "Condition Violation for Traffic Handling Priority", "Condition Violation for Guaranteed Bit Rate", "User Plane Versions not Supported", "Iu UP Failure", "Iu Transport Connection Failed to Establish".

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

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

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

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID

8.2.3 Unsuccessful Operation

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

8.2.4 Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

- *PDP Type Information*.

- *Data Volume Reporting Indication*.

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

   - for all queued RABs;

   - for RABs not already established or modified, and

   - for RABs not already released;

   with the cause "Relocation triggered".

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

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

   - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

8.7 Relocation Resource Allocation

8.7.1 General

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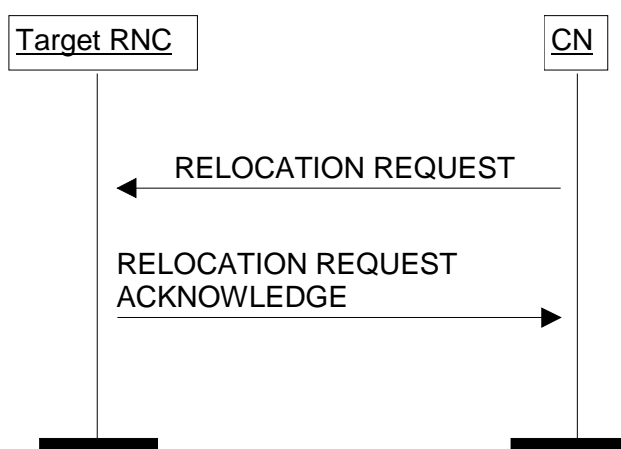
8.7.2 Successful Operation

Figure 7: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* IE (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information*

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

- *Service Handover*.

- *Alternative RAB Parameter Values*.

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*

- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)

- *Priority level, queuing and pre-emption indication*

- *Service Handover*

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

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

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

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

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

- *Transport Layer Address* (only for PS)

- *Iu Transport Association* (only for PS)

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

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

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

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

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

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".
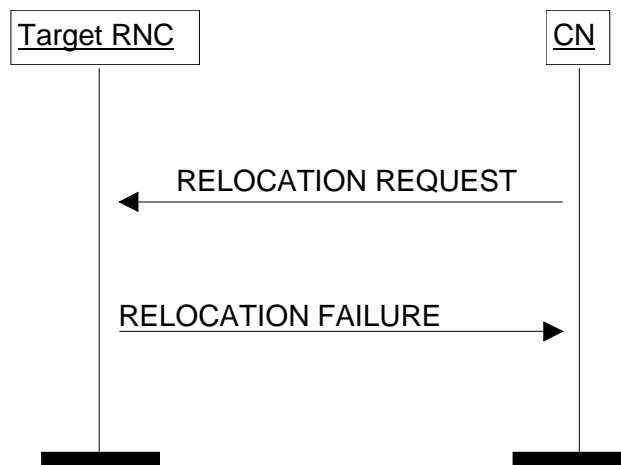
8.7.3 Unsuccessful Operation

Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

8.7.4 Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5 Co-ordination of Two Iu Signalling Connections

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

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

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

9.2.1.3   RAB Parameters

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Traffic Class	M		ENUMERATED (conversational, streaming, interactive, background, ...)	**Desc.:** This IE indicates the type of application for which the Radio Access Bearer service is optimised
>RAB Asymmetry Indicator	M		ENUMERATED (Symmetric bidirectional, Asymmetric Uni directional downlink, Asymmetric Uni directional Uplink, Asymmetric Bidirectional, ...)	**Desc.:** This IE indicates asymmetry or symmetry of the RAB and traffic direction
>Maximum Bit Rate	M	1 to <nbr-SeparateTrafficDirections>	INTEGER (1..16,000,000)	**Desc.:** This IE indicates the maximum number of bits delivered by UTRAN and to UTRAN at a SAP within a period of time, divided by the duration of the period. The unit is: bit/s **Usage**: When nbr-SeparateTrafficDirections is equal to 2, then Maximum Bit Rate attribute for downlink is signalled first, then Maximum Bit Rate attribute for uplink
>Guaranteed Bit Rate	C-iftrafficConv-Stream	0 to <nbr-SeparateTrafficDirections>	INTEGER (0..16,000,000)	**Desc.:** This IE indicates the guaranteed number of bits delivered at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The unit is: bit/s **Usage:** 1. When nbr-SeparateTrafficDirections is equal to 2, then Guaranteed Bit Rate for downlink is signalled first, then Guaranteed Bit Rate for uplink 2. Delay and reliability attributes only apply up to the guaranteed bit rate 3. Conditional valuefor the case of Support Mode for pre-defined SDU sizes: Set to highest not rate controllable bitrate, where bitrate is either − one of the RAB subflow combination bitrate IEs (when present) or − one of the calculated values given when dividing

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
				the compound Subflow combination SDU sizes by the value of the IE Maximum SDU Size and then multiplying this result by the value of the IE Maximum Bit Rate.
>Delivery Order	M		ENUMERATED (delivery order requested, delivery order not requested)	**Desc:** This IE indicates whether the RAB shall provide in-sequence SDU delivery or not **Usage:** Delivery order requested: in sequence delivery shall be guaranteed by UTRAN on all RAB SDUs Delivery order not requested: in sequence delivery is not required from UTRAN
>Maximum SDU Size	M		INTEGER (0..32768)	**Desc.:** This IE indicates the maximum allowed SDU size The unit is: bit. **Usage:** Conditional value: Set to largest RAB Subflow Combination compound SDU size (when present) among the different RAB Subflow Combinations
>SDU parameters		1 to \<maxRABSubflows\>	See below	**Desc.:** This IE contains the parameters characterizing the RAB SDUs **Usage** Given per subflow with first occurence corresponding to subflow#1 etc…
>Transfer Delay	C-iftrafficConv-Stream		INTEGER (0..65535)	**Desc.:** This IE indicates the maximum delay for 95th percentile of the distribution of delay for all delivered SDUs during the lifetime of a RAB, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP The unit is: millisecond. **Usage:** -
>Traffic Handling Priority	C - iftrafficInteractiv		INTEGER {spare (0), highest (1), .., lowest (14), no priority (15)} (0..15)	**Desc.:** This IE specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers **Usage:** Values between 1 and 14 are ordered in decreasing order of priority, '1' being the highest and '14' the lowest. Value 0 shall be treated as a logical error if received.
>Allocation/Retention priority	O		See below	**Desc.:** This IE specifies the relative importance compared to other Radio access bearers for allocation and retention of the Radio access bearer. **Usage:** If this IE is not received, the request is regarded as it cannot trigger the pre-emption process and it is vulnerable to the pre-emption process.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Source Statistics Descriptor	C-iftrafficConv-Stream		ENUMERATED (speech, unknown, …)	**Desc.:** This IE specifies characteristics of the source of submitted SDUs **Usage:** -
>Relocation Requirement	O		ENUMERATED (lossless, none, …, realtime)	This IE shall be present for RABs towards the PS domain, otherwise it shall not be present. **Desc.:** This IE is no longer used. **Usage:** It shall always be set to "none" when sent and it shall always be ignored when received.

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

Range Bound	Explanation
maxRABSubflows	Maximum number of Subflows per RAB. Value is 7

Condition	Explanation
IftrafficConv-Stream	This IE shall be present if the *Traffic Class* IE is set to "Conversational" or "Streaming"
IftrafficInteractiv	This IE shall be present if the *Traffic Class* IE is set to "Interactive"

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SDU parameters				
> SDU Error Ratio	C-ifErroneousSDU			**Desc.:** This IE indicates the fraction of SDUs lost or detected as erroneous. This is a Reliability attribute **Usage:** The attribute is coded as follows: Mantissa $* 10^{-\text{exponent}}$
>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..6)	
>Residual Bit Error Ratio	M			**Desc.:** This IE indicates the undetected bit error ratio for each subflow in the delivered SDU. This is a Reliability attribute. **Usage:** The attribute is coded as follows: Mantissa $* 10^{-\text{exponent}}$

>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..8)	
>Delivery Of Erroneous SDU	M		ENUMERATED (yes, no, no-error-detection-consideration)	**Desc.:** This IE indicates whether SDUs with detected errors shall be delivered or not. In case of unequal error protection, the attribute is set per subflow This is a Reliability attribute **Usage:** Yes: error detection applied, erroneous SDU delivered No. Error detection is applied , erroneous SDU discarded no-error-detection-consideration: SDUs delivered without considering error detection. If the RNC receives this IE set to 'Yes' and the *User Plane Mode* IE is set to 'transparent mode', it should consider it as 'no-error-detection-consideration'.
>SDU format information Parameter	~~C – IfSMPredefinedSDUSize~~O	1 to <maxRABSubflow Combinations>	See below	**Desc.:** This IE contains the list of possible exact sizes of SDUs and/or RAB Subflow Combination bit rates. Given per RAB Subflow Combination with first occurence corresponding to RAB Subflow Combination number 1. It shall always be present for rate controllable RABs.

Range Bound	Explanation
maxRABSubflowCombinations	Maximum number of RAB Subflow Combinations. Value is 64.

Condition	Explanation
IfErroneousSDU	This IE shall be present if the *Delivery Of Erroneous SDU* IE is set to "Yes" or "No".
~~IfSMPredefinedSDUSize~~	~~This IE shall be present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'.~~

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

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

9.2.1.4 Cause

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

9.3.4 Information Element Definitions

<mark>SOME UNCHANGED PARTS ARE OMITTED</mark>

```
    trafficHandlingPriority    TrafficHandlingPriority OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Interactive" --,
    allocationOrRetentionPriority   AllocationOrRetentionPriority OPTIONAL,
    sourceStatisticsDescriptor  SourceStatisticsDescriptor OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Conversational" or "Streaming" --,
    relocationRequirement   RelocationRequirement OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

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

RAB-SubflowCombinationBitRate   ::= INTEGER (0..16000000)

RAB-TrCH-Mapping ::=    SEQUENCE ( SIZE (1..maxNrOfRABs)) OF
    RAB-TrCH-MappingItem

RAB-TrCH-MappingItem ::= SEQUENCE {
    rAB-ID          RAB-ID,
    trCH-ID-List    TrCH-ID-List,
    ...
}

RAC                ::= OCTET STRING (SIZE (1))

RAI ::= SEQUENCE {
    lAI             LAI,
    rAC             RAC,
    iE-Extensions           ProtocolExtensionContainer { {RAI-ExtIEs} } OPTIONAL,
    ...
}

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

RateControlAllowed ::= ENUMERATED {
    not-allowed,
    allowed
}

RelocationRequirement ::= ENUMERATED {
    lossless,
    none,
    ...,
```

```
    realtime
}

RelocationType ::= ENUMERATED {
    ue-not-involved,
    ue-involved,
    ...
}

RepetitionNumber0 ::= INTEGER (0..255)

RepetitionNumber1 ::= INTEGER (1..256)


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

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

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

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

Requested-RAB-Parameter-Values-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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


RequestType ::= SEQUENCE {
    event               Event,
    reportArea          ReportArea,
    horizontalAccuracyCode      INTEGER (0..127)    OPTIONAL,
    ... ,
    verticalAccuracyCode            INTEGER (0..127)    OPTIONAL,
```

```
    -- To be used if Geographical Coordinates shall be reported with a requested accuracy. --
    responseTime                     ResponseTime    OPTIONAL,
    -- This IE shall be present if the Event IE is set to 'Direct' and the Report Area IE is set to 'Geographical Area'. --
    positioningPriority              PositioningPriority OPTIONAL,
    -- This IE shall be present if the Event IE is set to 'Direct' or "Change of Service Area". --
    clientType                       ClientType  OPTIONAL
    -- This IE shall be present if the Event IE is set to 'Direct'. --
}

ResidualBitErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..8),
    iE-Extensions               ProtocolExtensionContainer { {ResidualBitErrorRatio-ExtIEs} } OPTIONAL
}
-- ResidualBitErrorRatio = mantissa * 10^-exponent

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

ResponseTime      ::= ENUMERATED {
    lowdelay,
    delaytolerant,
...
}

RNC-ID                  ::= INTEGER (0..4095)
-- RNC-ID                 ::= BIT STRING (SIZE (12))
-- Harmonized with RNSAP and NBAP definitions

RRC-Container               ::= OCTET STRING

-- S

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

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

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

SAPI ::= ENUMERATED {
    sapi-0,
    sapi-3,
    ...
}
```

```
SDU-ErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..6),
    iE-Extensions           ProtocolExtensionContainer { {SDU-ErrorRatio-ExtIEs} } OPTIONAL
}
-- SDU-ErrorRatio = mantissa * 10^-exponent

SDU-ErrorRatio-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
SDU-FormatInformationParameters ::= SEQUENCE (SIZE (1..maxRAB-SubflowCombination)) OF
    SEQUENCE {
        subflowSDU-Size         SubflowSDU-Size     OPTIONAL,
        rAB-SubflowCombinationBitRate   RAB-SubflowCombinationBitRate   OPTIONAL,
        iE-Extensions           ProtocolExtensionContainer { {SDU-FormatInformationParameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-FormatInformationParameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SDU-Parameters ::= SEQUENCE (SIZE (1..maxRAB-Subflows)) OF
    SEQUENCE {
        sDU-ErrorRatio          SDU-ErrorRatio OPTIONAL
        -- This IE shall be present if the Delivery Of Erroneous SDU IE is set to "Yes" or "No" --,
        residualBitErrorRatio       ResidualBitErrorRatio,
        deliveryOfErroneousSDU      DeliveryOfErroneousSDU,
        sDU-FormatInformationParameters SDU-FormatInformationParameters OPTIONAL
        -- This IE shall be present for RABs with the IE User Plane Mode set to support mode for predefined SDU sizes --,
        iE-Extensions           ProtocolExtensionContainer { {SDU-Parameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Service-Handover ::= ENUMERATED {
    handover-to-GSM-should-be-performed,
    handover-to-GSM-should-not-be-performed,
    handover-to-GSM-shall-not-be-performed,
    ...
}

SourceID ::= CHOICE {
    sourceRNC-ID        SourceRNC-ID,
    sAI         SAI,
    ...
}
```

<div style="text-align: right">*CR-Form-v5*</div>

CHANGE REQUEST

⌘	**25.413 CR 437**	⌘**rev**	**-**	⌘	Current version:	**5.0.0**	⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Criticality Information Decoding Failure Handling	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	*Date:* ⌘ May, 2002
Category: ⌘	**A**	*Release:* ⌘ REL-5

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

Use <u>one</u> of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	Section 10.3.2 specifies that "when the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value". As all decoding errors result in an Error Indication procedure being sent with a cause value of Transfer Syntax error as specified in section 10.2, this specification statement is not required and causes confusion.
Summary of change: ⌘	The above-mentioned specification statement in section 10.3.2 is removed. <u>Impact analysis</u> Impact assessment towards the previous version of the specification (same release): The CR has isolated impact with the previous version of the specification (same release). The impact can be considered isolated because the change affects one (or more) system function(s), namely the error handling function and has the possibility to affect existing implementations even though the change is functional and protocol compatible.
Consequences if not approved: ⌘	The specification statement seems to indicate that when the criticality information cannot be decoded, it needs to be handled in a different way from handling Transfer Syntax protocol error. If not approved, this ambiguity will persist.

Clauses affected: ⌘	10.3.2
Other specs ⌘ **X** affected:	Other core specifications ⌘ 25.413 R99 CR 412, 25.413 R4 CR 413, 25.419 R99 CR 095, 25.419 R4 CR 096, 25.419 R5 CR 097, 25.423 R99 CR 590, 25.423 R4 CR 591, 25.423 R5 CR 599, 25.433 R99 CR 630, 25.433 R4 CR 631, 25.433 R5 CR 633, 25.453 R5 CR 017
	Test specifications None.

	O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:

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

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

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

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

- Violation in list element constraints. e.g.: If a list is defined as containing 1 to 10 elements, and 12 elements will be received, than this case will be handled as a transfer syntax error.

- Missing mandatory elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

- Wrong order of elements in ASN.1 SEQUENCE definitions (as sent by the originator of the message).

10.3   Abstract Syntax Error

10.3.1   General

An Abstract Syntax Error occurs when the receiving functional RANAP entity:

1. receives IEs or IE groups that cannot be understood (unknown IE ID);

2. receives IEs for which the logical range is violated (e.g.: ASN.1 definition: 0 to 15, the logical range is 0 to 10 (values 11 to 15 are undefined), and 12 will be received; this case will be handled as an abstract syntax error using criticality information sent by the originator of the message);

3. does not receive IEs or IE groups but according to the specified presence of the concerning object, the IEs or IE groups should have been present in the received message.

4. receives IEs or IE groups that are defined to be part of that message in wrong order or with too many occurrences of the same IE or IE group;

5. receives IEs or IE groups but according to the conditional presence of the concerning object and the specified condition, the IEs or IE groups should not have been present in the received message.

Cases 1 and 2 (not comprehended IE/IE group) are handled based on received Criticality information. Case 3 (missing IE/IE group) is handled based on Criticality information and Presence information for the missing IE/IE group specified in the version of the specification used by the receiver. Case 4 (IEs or IE groups in wrong order or with too many occurrences) and Case 5 (erroneously present conditional IEs or IE groups) result in rejecting the procedure.

If an Abstract Syntax Error occurs, the receiver shall read the remaining message and shall then for each detected Abstract Syntax Error that belong to cases 1-3 act according to the Criticality Information and Presence Information for the IE/IE group due to which Abstract Syntax Error occurred in accordance with subclauses 10.3.4 and 10.3.5. The handling of cases 4 and 5 is specified in subclause 10.3.6.

10.3.2   Criticality Information

In the RANAP messages there is criticality information set for individual IEs and/or IE groups. This criticality information instructs the receiver how to act when receiving an IE or an IE group that is not comprehended, i.e. the entire item (IE or IE group) which is not (fully or partially) comprehended shall be treated in accordance with its own criticality information as specified in subclause 10.3.4.

In addition, the criticality information is used in case of the missing IE/IE group abstract syntax error (see subclause 10.3.5).

The receiving node shall take different actions depending on the value of the Criticality Information. The three possible values of the Criticality Information for an IE/IE group are:

- Reject IE.

- Ignore IE and Notify Sender.

- Ignore IE.

The following rules restrict when a receiving entity may consider an IE, an IE group, or an EP not comprehended (not implemented), and when action based on criticality information is applicable:

1. IE or IE group: When one new or modified IE or IE group is implemented for one EP from a standard version, then other new or modified IEs or IE groups specified for that EP in that standard version shall be considered comprehended by a receiving entity (some may still remain unsupported).

   Note that this restriction is not applicable to a sending entity for constructing messages.

2. EP: The comprehension of different EPs within a standard version or between different standard versions is not mandated. Any EP that is not supported may be considered not comprehended, even if another EP from that standard version is comprehended, and action based on criticality shall be applied.

~~When the criticality information cannot even be decoded in a not comprehended IE or IE group, the Error Indication procedure shall be initiated with an appropriate cause value.~~

10.3.3   Presence Information

For many IEs/IE groups which are optional according to the ASN.1 transfer syntax, RANAP specifies separately if the presence of these IEs/IE groups is optional or mandatory with respect to RNS application by means of the presence field of the concerning object of class RANAP-PROTOCOL-IES, RANAP-PROTOCOL-IES-PAIR, RANAP-PROTOCOL-EXTENSION or RANAP-PRIVATE-IES.

The presence field of the indicated classes supports three values:

1. Optional;

2. Conditional;

3. Mandatory.

If an IE/IE group is not included in a received message and the presence of the IE/IE group is mandatory or the presence is conditional and the condition is true according to the version of the specification used by the receiver, an abstract syntax error occurs due to a missing IE/IE group.

If an IE/IE group is included in a received message and the presence of the IE/IE group is conditional and the condition is false according to the version of the specification used by the receiver, an abstract syntax error occurs due to this erroneously present conditional IE/IE group.

10.3.4   Not comprehended IE/IE group

10.3.4.1   Procedure Code

The receiving node shall treat the different types of received criticality information of the *Procedure Code* IE according to the following:

Reject IE:

- If a message is received with a *Procedure Code* IE marked with "*Reject IE*" which the receiving node does not comprehend, the receiving node shall reject the procedure using the Error Indication procedure.

Ignore IE and Notify Sender:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE and Notify Sender*" which the receiving node does not comprehend, the receiving node shall ignore the procedure and initiate the Error Indication procedure.

Ignore IE:

- If a message is received with a *Procedure Code* IE marked with "*Ignore IE*" which the receiving node does not comprehend, the receiving node shall ignore the procedure.

When using the Error Indication procedure to reject a procedure or to report an ignored procedure it shall include the *Procedure Code* IE, the *Triggering Message* IE, and the *Procedure Criticality* IE in the *Criticality Diagnostics* IE.

CR-Form-v5

CHANGE REQUEST

⌘ **25.413** CR **438** ⌘ **rev 2** ⌘ Current version: **3.9.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Erroneous Security Mode Control procedure	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-05-30

Category: ⌘ **F**   ***Release:*** ⌘ R99

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

Use <u>one</u> of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ At RAN2 meeting #27, the following regarding security was agreed:

- In case of signalling connections to both domains, the same ciphering algorithm needs to be applied on both domains. The status of ciphering (i.e. started or not started) shall be the same for both domains.

- In case ciphering is started in one CN domain, a subsequently established signalling connection on the other CN domain also needs to be ciphered (with the same ciphering algorithm).

This change takes into account a change that was introduced in 33.102 about two years ago, but which so far has not been reflected in RANAP. This change in 33.102 (subclause 6.4.2) states:

- Change of ciphering and integrity mode (algorithms) at establishment of a second MS to CN connection shall not be permitted. The preferences and special requirements for the ciphering and integrity mode setting shall be common for both domains. (e.g. the order of preference of the algorithms).

The recent change agreed by RAN2 and the text from 33.102 shown above are not in agreement with what today is stated in RANAP. The current text in RANAP is based on the understanding that the ciphering and integrity protection information need not be aligned between the two CNs.

Besides the changes based on what is stated above it also needs to be clarified that since changing of algorithms is not allowed, the only reason for a CN to send a second SECURITY MODE COMMAND message for an existing signalling connection is in order to activate new integrity protection and ciphering keys.

It also needs to be made more clear that the value "no encryption" in the *Encryption Information* IE is not equal to UEA0, but can result in either using UEA0 or in not starting ciphering at all.

<u>Note</u>: How the co-ordination of security information between the two CNs is

		achieved is nowhere described, but is out of the scope of this CR.
Summary of change: ⌘		The procedure text in RANAP regarding security handling is changed in order to be aligned with the above shown statements. Impact assessment towards the previous version of the specification (same release): This CR has isolated impact towards the previous version of the specification (same release). This CR has an impact under functional point of view. The impact can be considered isolated because it only changes the conditions for when to accept a SECURITY MODE COMMAND message.
Consequences if not approved:	⌘	There will be a misalignment between RANAP and TSes 33.102 and 25.331 regarding security handling. This will lead to erroneous implementations.

Clauses affected:	⌘	8.7.2, 8.18, 9.2.1.4, 9.3.4
Other specs	⌘ **X**	Other core specifications ⌘ 25.413 V4.4.0 CR439
affected:		Test specifications 25.413 V5.0.0 CR440
		O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

8.7 Relocation Resource Allocation

8.7.1 General

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

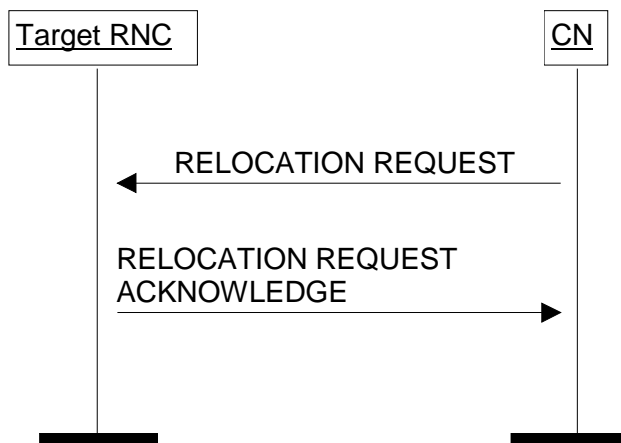## 8.7.2 Successful Operation

Figure 1: Relocation Resource Allocation procedure. Successful operation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

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

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

- *Service Handover*

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- RAB-ID

- User plane Information

- Priority level, queuing and pre-emption indication

- Service Handover

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

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

- *Transport Layer Address* (only for PS)

- *Iu Transport Association* (only for PS)

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE. This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

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

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

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

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

8.7.3   Unsuccessful Operation

Figure 2: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

8.7.4 Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5 Co-ordination of Two Iu Signalling Connections

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

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

8.18 Security Mode Control

8.18.1 General

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

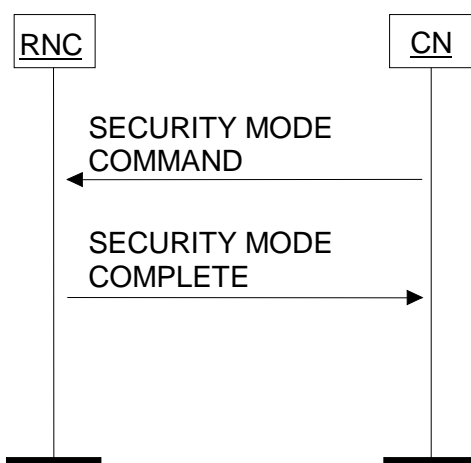## 8.18.2 Successful Operation

Figure 3: Security Mode Control procedure. Successful operation.

The CN shall start the procedure by sending to the UTRAN a SECURITY MODE COMMAND message. This message may contain the *Encryption Information* IE and shall contain the *Integrity Protection Information* IE, specifying, in preferred order with the most preferred first in the list, which ciphering, if any, and integrity protection algorithms may be used by the UTRAN.

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 if it cannot support any of the indicated UEAs. In the absence of the *Encryption Information* group IE in SECURITY MODE COMMAND message, the RNC shall handle it as not start cipheringencryption.

Upon reception of the SECURITY MODE COMMAND message, the UTRAN shall internally select appropriate algorithms, taking into account the UE/UTRAN capabilities. If a signalling connection already exists towards the other core network domain, and integrity protection and ciphering information has been received from that core network domain, the same algorithm(s) as being used for that core network domain shall be selected. This also means for encryption that if "no encryption" or no *Encryption Information* IE has been received from the first core network domain and ciphering has not been started, ciphering shall also not be started for the second core network domain. The UTRAN shall then trigger the execution of the corresponding radio interface procedure and, if applicable, start/restartinvoke the encryption device and also start/restart the integrity protection.

The CN may send a SECURITY MODE COMMAND message towards the RNC also when integrity protection and possibly ciphering has already been started for an existing signalling connection towards that core network domain. This may be used to activate new integrity protection and ciphering keys. The included integrity protection and ciphering information shall then support (at least) the integrity protection alternative and the ciphering alternative presently being used and the *Key Status* IE shall have the value "New".

When the execution of the radio interface procedure is successfully finished, UTRAN shall return a SECURITY MODE COMPLETE message to the CN. This message shall include the *Chosen Integrity Protection Algorithm* IE and may include the *Chosen Encryption Algorithm* IE.

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

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

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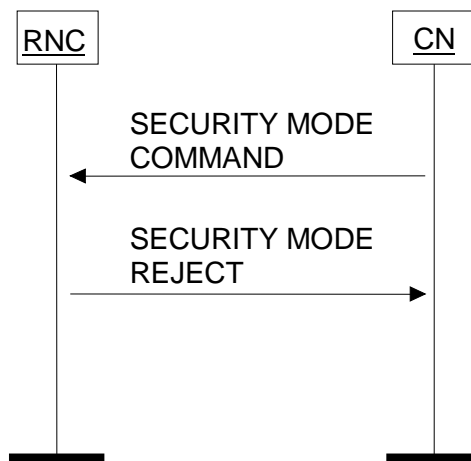
8.18.3 Unsuccessful Operation

Figure 4: Security Mode Control procedure. Unsuccessful operation.

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

8.18.4 Abnormal Conditions

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

If, when establishing a signalling connection towards a second core network domain, the integrity protection and ciphering information specified in the SECURITY MODE COMMAND message does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be sent to the second core network domain with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection from that core nework domain and for which integrity protection and possibly ciphering has already been started, the *Key Status* IE has the value "Old", a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection and for which integrity protection and possibly ciphering has already been started, the included integrity protection and ciphering information does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

9.2.1.4 Cause

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

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			Invalid RAB Parameters Value(19),	
			Requested Maximum Bit Rate not Available(20),	
			Requested Maximum Bit Rate for DL not Available(33),	
			Requested Maximum Bit Rate for UL not Available(34),	
			Requested Guaranteed Bit Rate not Available(21),	
			Requested Guaranteed Bit Rate for DL not Available(35),	
			Requested Guaranteed Bit Rate for UL not Available(36),	
			Requested Transfer Delay not Achievable(22),	
			Invalid RAB Parameters Combination(23),	
			Condition Violation for SDU Parameters(24),	
			Condition Violation for Traffic Handling Priority(25),	
			Condition Violation for Guaranteed Bit Rate(26),	
			User Plane Versions not Supported(27),	
			Iu UP Failure(28),	
			TRELOCalloc Expiry (7),	
			Relocation Failure in Target CN/RNC or Target System	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(29),	
			Invalid RAB ID(30),	
			No remaining RAB(31),	
			Interaction with other procedure(32),	
			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)	
			…)	

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(…)	

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

Radio Network Layer cause	Meaning
Conflict with already existing Integrity protection and/or Ciphering information~~Change Of Ciphering And/Or Integrity Protection Is Not Suppor~~ted	The action was not performed due to that the requested security mode configuration was in conflict with the already existing security mode configuration.~~The UTRAN and/or the UE are/is unable to support the requested change of ciphering and/or integrity protection algorithms.~~
Condition Violation For Guaranteed Bit Rate	The action was not performed due to condition violation for guaranteed bit rate.
Condition Violation For SDU Parameters	The action was not performed due to condition violation for SDU parameters.
Condition Violation For Traffic Handling Priority	The action was not performed due to condition violation for traffic handling priority.
Directed Retry	The reason for action is Directed Retry
Failure In The Radio Interface Procedure	Radio interface procedure has failed.
Interaction With Other Procedure	Relocation was cancelled due to interaction with other procedure.
Invalid RAB ID	The action failed because the RAB ID is unknown in the RNC.
Invalid RAB Parameters Combination	The action failed due to invalid RAB parameters combination.
Invalid RAB Parameters Value	The action failed due to invalid RAB parameters value.
Iu UP Failure	The action failed due to Iu UP failure.
No remaining RAB	The reason for the action is no remaining RAB.
RAB Pre-empted	The reason for the action is that RAB is pre-empted.
Radio Connection With UE Lost	The action is requested due to losing radio connection to the UE
Release Due To UE Generated Signalling Connection Release	Release requested due to UE generated signalling connection release.
Release Due To UTRAN Generated Reason	Release is initiated due to UTRAN generated reason.
Relocation Cancelled	The reason for the action is relocation cancellation.
Relocation Desirable for Radio Reasons	The reason for requesting relocation is radio related.
Relocation Failure In Target CN/RNC Or Target System	Relocation failed due to a failure in target CN/RNC or target system.
Relocation Not Supported In Target RNC Or Target System	Relocation failed because relocation was not supported in target RNC or target system.
Relocation Triggered	The action failed due to relocation.
Repeated Integrity Checking Failure	The action is requested due to repeated failure in integrity checking.
Request Superseded	The action failed because there was a second request on the same RAB.
Requested Ciphering And/Or Integrity Protection Algorithms Not Supported	The UTRAN or the UE is unable to support the requested ciphering and/or integrity protection algorithms.
Requested Guaranteed Bit Rate For DL Not Available	The action failed because requested guaranteed bit rate for DL is not available.
Requested Guaranteed Bit Rate For UL Not Available	The action failed because requested guaranteed bit rate for UL is not available.
Requested Guaranteed Bit Rate Not Available	The action failed because requested guaranteed bit rate is not available.
Requested Information Not Available	The action failed because requested information is not available.
Requested Maximum Bit Rate For DL Not Available	The action failed because requested maximum bit rate for DL is not available.
Requested Maximum Bit Rate For UL Not Available	The action failed because requested maximum bit rate for UL is not available.
Requested Maximum Bit Rate Not Available	The action failed because requested maximum bit rate is not available.
Requested 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.
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.
T$_{QUEUING}$ Expiry	The action failed due to expiry of the timer T$_{QUEUING}$.
T$_{RELOCalloc}$ Expiry	Relocation Resource Allocation procedure failed due to expiry of the timer T$_{RELOCalloc}$.
T$_{RELOCcomplete}$ Expiry	The reason for the action is expiry of timer T$_{RELOCcomplete}$.
T$_{RELOCoverall}$ Expiry	The reason for the action is expiry of timer T$_{RELOCoverall}$.
T$_{RELOCprep}$ Expiry	Relocation Preparation procedure is cancelled when timer T$_{RELOCprep}$ expires.
Unable To Establish During Relocation	RAB failed to establish during relocation because it cannot be supported in the target RNC.
Unknown Target RNC	Relocation rejected because the target RNC is not known to the CN.
User Inactivity	The action is requested due to user inactivity.
User Plane Versions Not Supported	The action failed because requested user plane versions were not supported.

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

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

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

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

9.3.4   Information Element Definitions

```
-- ***************************************************************
--
-- Information Element Definitions
--
-- ***************************************************************

RANAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxNrOfPDPDirections,
    maxNrOfPoints,
    maxNrOfRABs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,

    id-MessageStructure,
    id-TypeOfError

FROM RANAP-Constants

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

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

-- A

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

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

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

-- B

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

-- C


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

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

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

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

} (97..112)

CauseRadioNetwork ::= INTEGER {
    rab-pre-empted (1),
```

```
    trelocoverall-expiry (2),
    trelocprep-expiry (3),
    treloccomplete-expiry (4),
    tqueing-expiry (5),
    relocation-triggered (6),
    trellocalloc-expiry(7),
    unable-to-establish-during-relocation (8),
    unknown-target-rnc (9),
    relocation-cancelled (10),
    successful-relocation (11),
    requested-ciphering-and-or-integrity-protection-algorithms-not-supported (12),
    conflict-with-already-existing-integrity-protection-and-or-ciphering-information change-of-ciphering-and-or-integrity-protection-is-not-
supported (13),
    failure-in-the-radio-interface-procedure (14),
    release-due-to-utran-generated-reason (15),
    user-inactivity (16),
    time-critical-relocation (17),
    requested-traffic-class-not-available (18),
    invalid-rab-parameters-value (19),
    requested-maximum-bit-rate-not-available (20),
    requested-guaranteed-bit-rate-not-available (21),
    requested-transfer-delay-not-achievable (22),
    invalid-rab-parameters-combination (23),
    condition-violation-for-sdu-parameters (24),
    condition-violation-for-traffic-handling-priority (25),
    condition-violation-for-guaranteed-bit-rate (26),
    user-plane-versions-not-supported (27),
    iu-up-failure (28),
    relocation-failure-in-target-CN-RNC-or-target-system(29),
    invalid-RAB-ID (30),
    no-remaining-rab (31),
    interaction-with-other-procedure (32),
    requested-maximum-bit-rate-for-dl-not-available (33),
    requested-maximum-bit-rate-for-ul-not-available (34),
    requested-guaranteed-bit-rate-for-dl-not-available (35),
    requested-guaranteed-bit-rate-for-ul-not-available (36),
    repeated-integrity-checking-failure (37),
    requested-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)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)

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

```
} (65..80)
```

****   LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.4 REMOVED   ****

<table>
<tr><td colspan="2" align="right">*CR-Form-v5*</td></tr>
</table>

CHANGE REQUEST

⌘	**25.413**	CR	**439**	⌘ **rev**	**2**	⌘	Current version:	**4.4.0**	⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Erroneous Security Mode Control procedure	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-05-30
Category: ⌘ **A**		***Release:*** ⌘ REL-4

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

Use <u>one</u> of the following releases:
   2   *(GSM Phase 2)*
   R96 *(Release 1996)*
   R97 *(Release 1997)*
   R98 *(Release 1998)*
   R99 *(Release 1999)*
   REL-4 *(Release 4)*
   REL-5 *(Release 5)*

Reason for change: ⌘	At RAN2 meeting #27, the following regarding security was agreed:

- In case of signalling connections to both domains, the same ciphering algorithm needs to be applied on both domains. The status of ciphering (i.e. started or not started) shall be the same for both domains.

- In case ciphering is started in one CN domain, a subsequently established signalling connection on the other CN domain also needs to be ciphered (with the same ciphering algorithm).

This change takes into account a change that was introduced in 33.102 about two years ago, but which so far has not been reflected in RANAP. This change in 33.102 (subclause 6.4.2) states:

- Change of ciphering and integrity mode (algorithms) at establishment of a second MS to CN connection shall not be permitted. The preferences and special requirements for the ciphering and integrity mode setting shall be common for both domains. (e.g. the order of preference of the algorithms).

The recent change agreed by RAN2 and the text from 33.102 shown above are not in agreement with what today is stated in RANAP. The current text in RANAP is based on the understanding that the ciphering and integrity protection information need not be aligned between the two CNs.

Besides the changes based on what is stated above it also needs to be clarified that since changing of algorithms is not allowed, the only reason for a CN to send a second SECURITY MODE COMMAND message for an existing signalling connection is in order to activate new integrity protection and ciphering keys.

It also needs to be made more clear that the value "no encryption" in the *Encryption Information* IE is not equal to UEA0, but can result in either using UEA0 or in not starting ciphering at all.

<u>Note</u>: How the co-ordination of security information between the two CNs is

		achieved is nowhere described, but is out of the scope of this CR.
Summary of change: ⌘		The procedure text in RANAP regarding security handling is changed in order to be aligned with the above shown statements. Impact assessment towards the previous version of the specification (same release): This CR has isolated impact towards the previous version of the specification (same release). This CR has an impact under functional point of view. The impact can be considered isolated because it only changes the conditions for when to accept a SECURITY MODE COMMAND message.
Consequences if not approved:	⌘	There will be a misalignment between RANAP and TSes 33.102 and 25.331 regarding security handling. This will lead to erroneous implementations.

Clauses affected:	⌘	8.7.2, 8.18, 9.2.1.4, 9.3.4
Other specs	⌘ **X**	Other core specifications	⌘	25.413 V3.9.0 CR438 25.413 V5.0.0 CR440
affected:		Test specifications O&M Specifications		
Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

8.7 Relocation Resource Allocation

8.7.1 General

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

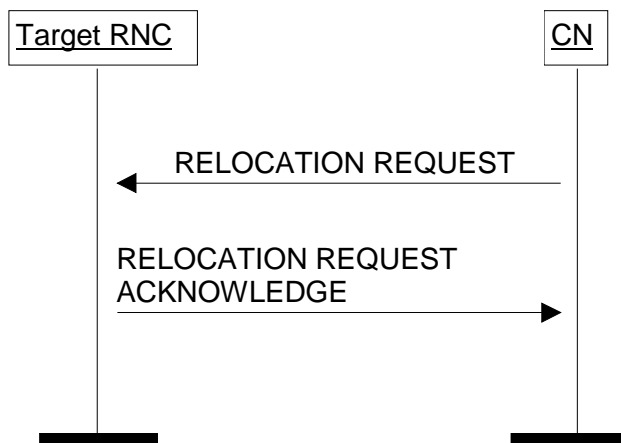## 8.7.2 Successful Operation

Figure 1: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* IE (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

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

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

- *Service Handover.*

- *Alternative RAB Parameter Values.*

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*

- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)

- *Priority level, queuing and pre-emption indication*

- *Service Handover*

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

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

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

- The target RNC shall include information adapted to the resulting RAB configuration in the target to source RNC transparent container to be included in the RELOCATION REQUEST ACKNOWLEDGE message sent to the CN. If the target RNC supports triggering of the Relocation Detect procedure via the Iur interface, the RNC

shall assign a d-RNTI for the context of the relocation and include it in the container. If two CNs are involved in the relocation of SRNS, the target RNC may, however, decide to send the container to only one CN.

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

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

- *Transport Layer Address* (only for PS)

- *Iu Transport Association* (only for PS)

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

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

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

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

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

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".
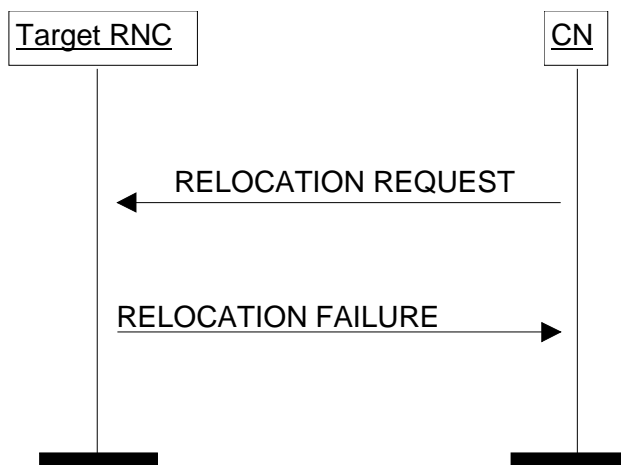
8.7.3 Unsuccessful Operation

Figure 2: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

8.7.4 Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5 Co-ordination of Two Iu Signalling Connections

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

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

8.18 Security Mode Control

8.18.1 General

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

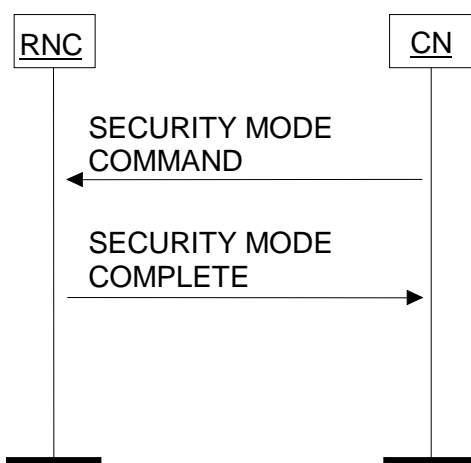## 8.18.2 Successful Operation

Figure 3: Security Mode Control procedure. Successful operation.

The CN shall start the procedure by sending to the UTRAN a SECURITY MODE COMMAND message. This message may contain the *Encryption Information* IE and shall contain the *Integrity Protection Information* IE, specifying, in preferred order with the most preferred first in the list, which ciphering, if any, and integrity protection algorithms may be used by the UTRAN.

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 algorithmif it cannot support any of the indicated UEAs. In the absence of the *Encryption Information* group IE in SECURITY MODE COMMAND message, the RNC shall handle it as not start ciphering encryption.

Upon reception of the SECURITY MODE COMMAND message, the UTRAN shall internally select appropriate algorithms, taking into account the UE/UTRAN capabilities. If a signalling connection already exists towards the other core network domain, and integrity protection and ciphering information has been received from that core network domain, the same algorithm(s) as being used for that core network domain shall be selected. This also means for encryption that if "no encryption" or no *Encryption Information* IE has been received from the first core network domain and ciphering has not been started, ciphering shall also not be started for the second core network domain. The UTRAN shall then trigger the execution of the corresponding radio interface procedure and, if applicable, start/restartinvoke the encryption device and also start/restart the integrity protection.

The CN may send a SECURITY MODE COMMAND message towards the RNC also when integrity protection and possibly ciphering has already been started for an existing signalling connection towards that core network domain. This may be used to activate new integrity protection and ciphering keys. The included integrity protection and ciphering information shall then support (at least) the integrity protection alternative and the ciphering alternative presently being used and the *Key Status* IE shall have the value "New".

When the execution of the radio interface procedure is successfully finished, UTRAN shall return a SECURITY MODE COMPLETE message to the CN. This message shall include the *Chosen Integrity Protection Algorithm* IE and may include the *Chosen Encryption Algorithm* IE.

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

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

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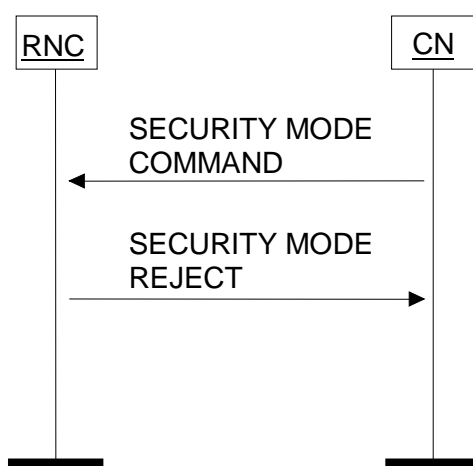
8.18.3 Unsuccessful Operation

Figure 4: Security Mode Control procedure. Unsuccessful operation.

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

8.18.4 Abnormal Conditions

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

If, when establishing a signalling connection towards a second core network domain, the integrity protection and ciphering information specified in the SECURITY MODE COMMAND message does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be sent to the second core network domain with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection from that core nework domain and for which integrity protection and possibly ciphering has already been started, the *Key Status* IE has the value "Old", a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection and for which integrity protection and possibly ciphering has already been started, the included integrity protection and ciphering information does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

9.2.1.4   Cause

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

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			Invalid RAB Parameters Value(19),	
			Requested Maximum Bit Rate not Available(20),	
			Requested Maximum Bit Rate for DL not Available(33),	
			Requested Maximum Bit Rate for UL not Available(34),	
			Requested Guaranteed Bit Rate not Available(21),	
			Requested Guaranteed Bit Rate for DL not Available(35),	
			Requested Guaranteed Bit Rate for UL not Available(36),	
			Requested Transfer Delay not Achievable(22),	
			Invalid RAB Parameters Combination(23),	
			Condition Violation for SDU Parameters(24),	
			Condition Violation for Traffic Handling Priority(25),	
			Condition Violation for Guaranteed Bit Rate(26),	
			User Plane Versions not Supported(27),	
			Iu UP Failure(28),	
			TRELOCalloc Expiry (7),	
			Relocation Failure in Target CN/RNC or Target System	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(29),	
			Invalid RAB ID(30),	
			No remaining RAB(31),	
			Interaction with other procedure(32),	
			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	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			not allowed(50))	

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(…)	

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

Radio Network Layer cause	Meaning
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 informationChange Of Ciphering And/Or Integrity Protection Is Not Supported	The action was not performed due to that the requested security mode configuration was in conflict with the already existing security mode configuration.The UTRAN and/or the UE are/is unable to support the requested change of ciphering and/or integrity protection algorithms.
Condition Violation For Guaranteed Bit Rate	The action was not performed due to condition violation for guaranteed bit rate.
Condition Violation For SDU Parameters	The action was not performed due to condition violation for SDU parameters.
Condition Violation For Traffic Handling Priority	The action was not performed due to condition violation for traffic handling priority.
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.
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.
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.
$T_{QUEUING}$ Expiry	The action failed due to expiry of the timer $T_{QUEUING}$.
$T_{RELOCalloc}$ Expiry	Relocation Resource Allocation procedure failed due to expiry of the timer $T_{RELOCalloc}$.
$T_{RELOCcomplete}$ Expiry	The reason for the action is expiry of timer $T_{RELOCcomplete}$.
$T_{RELOCoverall}$ Expiry	The reason for the action is expiry of timer $T_{RELOCoverall}$.
$T_{RELOCprep}$ Expiry	Relocation Preparation procedure is cancelled when timer $T_{RELOCprep}$ expires.
Unable To Establish During Relocation	RAB failed to establish during relocation because it cannot be supported in the target RNC.
Unknown Target RNC	Relocation rejected because the target RNC is not known to the CN.
User Inactivity	The action is requested due to user inactivity.
User Plane Versions Not Supported	The action failed because requested user plane versions were not supported.
RNC unable to establish all RFCs	RNC couldn't establish all RAB subflow combinations indicated within the *RAB Parameters* IE.

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

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

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

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

9.3.4 Information Element Definitions

```
-- ****************************************************************
--
-- Information Element Definitions
--
-- ****************************************************************

RANAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxNrOfPDPDirections,
    maxNrOfPoints,
    maxNrOfRABs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,
    maxNrOfAltValues,

    id-MessageStructure,
    id-TypeOfError

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


-- 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 change-of-ciphering-and-or-integrity-protection-is-not-
supported (13),
    failure-in-the-radio-interface-procedure (14),
    release-due-to-utran-generated-reason (15),
    user-inactivity (16),
    time-critical-relocation (17),
    requested-traffic-class-not-available (18),
    invalid-rab-parameters-value (19),
    requested-maximum-bit-rate-not-available (20),
    requested-guaranteed-bit-rate-not-available (21),
    requested-transfer-delay-not-achievable (22),
    invalid-rab-parameters-combination (23),
    condition-violation-for-sdu-parameters (24),
    condition-violation-for-traffic-handling-priority (25),
    condition-violation-for-guaranteed-bit-rate (26),
    user-plane-versions-not-supported (27),
```

```
    iu-up-failure (28),
    relocation-failure-in-target-CN-RNC-or-target-system(29),
    invalid-RAB-ID (30),
    no-remaining-rab (31),
    interaction-with-other-procedure (32),
    requested-maximum-bit-rate-for-dl-not-available (33),
    requested-maximum-bit-rate-for-ul-not-available (34),
    requested-guaranteed-bit-rate-for-dl-not-available (35),
    requested-guaranteed-bit-rate-for-ul-not-available (36),
    repeated-integrity-checking-failure (37),
    requested-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)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)

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

****   LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.4 REMOVED   ****

CR-Form-v5

CHANGE REQUEST

⌘ | **25.413** | CR | **440** | ⌘**rev** | **2** | ⌘ | Current version: | **5.0.0** | ⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Erroneous Security Mode Control procedure	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-05-30

Category: ⌘   **A**   ***Release:*** ⌘   REL-5

Use one of the following categories:	*Use one of the following releases:*
F *(correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(addition of feature),*	*R97 (Release 1997)*
C *(functional modification of feature)*	*R98 (Release 1998)*
D *(editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change: ⌘	At RAN2 meeting #27, the following regarding security was agreed: - In case of signalling connections to both domains, the same ciphering algorithm needs to be applied on both domains. The status of ciphering (i.e. started or not started) shall be the same for both domains. - In case ciphering is started in one CN domain, a subsequently established signalling connection on the other CN domain also needs to be ciphered (with the same ciphering algorithm). This change takes into account a change that was introduced in 33.102 about two years ago, but which so far has not been reflected in RANAP. This change in 33.102 (subclause 6.4.2) states: - Change of ciphering and integrity mode (algorithms) at establishment of a second MS to CN connection shall not be permitted. The preferences and special requirements for the ciphering and integrity mode setting shall be common for both domains. (e.g. the order of preference of the algorithms). The recent change agreed by RAN2 and the text from 33.102 shown above are not in agreement with what today is stated in RANAP. The current text in RANAP is based on the understanding that the ciphering and integrity protection information need not be aligned between the two CNs. Besides the changes based on what is stated above it also needs to be clarified that since changing of algorithms is not allowed, the only reason for a CN to send a second SECURITY MODE COMMAND message for an existing signalling connection is in order to activate new integrity protection and ciphering keys. It also needs to be made more clear that the value "no encryption" in the *Encryption Information* IE is not equal to UEA0, but can result in either using UEA0 or in not starting ciphering at all. Note: How the co-ordination of security information between the two CNs is

		achieved is nowhere described, but is out of the scope of this CR.
Summary of change: ⌘		The procedure text in RANAP regarding security handling is changed in order to be aligned with the above shown statements.
		Impact assessment towards the previous version of the specification (same release):
		This CR has isolated impact towards the previous version of the specification (same release).
		This CR has an impact under functional point of view.
		The impact can be considered isolated because it only changes the conditions for when to accept a SECURITY MODE COMMAND message.
Consequences if not approved:	⌘	There will be a misalignment between RANAP and TSes 33.102 and 25.331 regarding security handling. This will lead to erroneous implementations.

Clauses affected:	⌘	8.7.2, 8.18, 9.2.1.4, 9.3.4
Other specs	⌘ X	Other core specifications ⌘ 25.413 V3.9.0 CR438
affected:		25.413 V4.4.0 CR439
		Test specifications
		O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

8.7 Relocation Resource Allocation

8.7.1 General

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

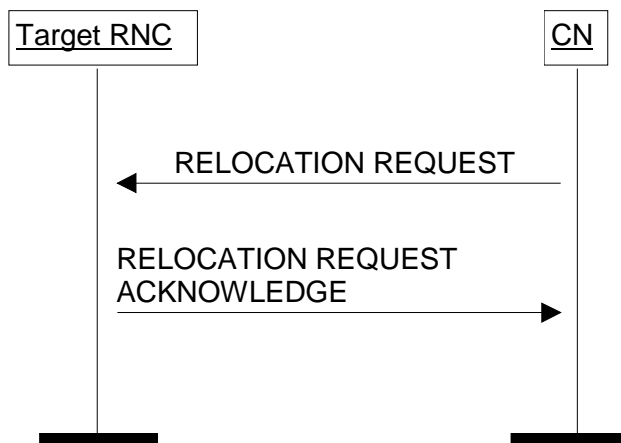## 8.7.2 Successful Operation

Figure 1: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* IE (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

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

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

- *Service Handover.*

- *Alternative RAB Parameter Values.*

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*

- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)

- *Priority level, queuing and pre-emption indication*

- *Service Handover*

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

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

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

- The target RNC shall include information adapted to the resulting RAB configuration in the target to source RNC transparent container to be included in the RELOCATION REQUEST ACKNOWLEDGE message sent to the CN. If the target RNC supports triggering of the Relocation Detect procedure via the Iur interface, the RNC

shall assign a d-RNTI for the context of the relocation and include it in the container. If two CNs are involved in the relocation of SRNS, the target RNC may, however, decide to send the container to only one CN.

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

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

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

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

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the target RNC supports cell load-based inter-system handover, then in the case of inter-system handover, the *New BSS to Old BSS Information* IE may be included in the RELOCATION REQUEST ACKNOWLEDGE message.

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

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

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

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

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".
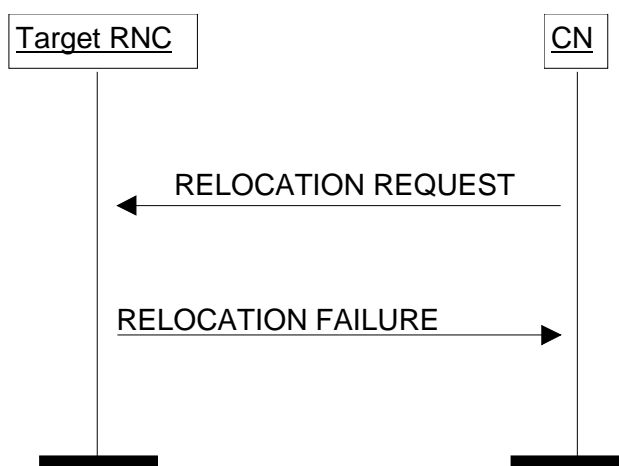
8.7.3   Unsuccessful Operation

Figure 2: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

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

-    the *NewBSS to Old BSS Information* IE may be included in the RELOCATION FAILURE message.

-    the RELOCATION FAILURE message may contain the appropriate value in the *Cause* IE, e.g. "No Radio Resources Available in Target Cell".

8.7.4   Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5   Co-ordination of Two Iu Signalling Connections

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

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

-    The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

8.18 Security Mode Control

8.18.1 General

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

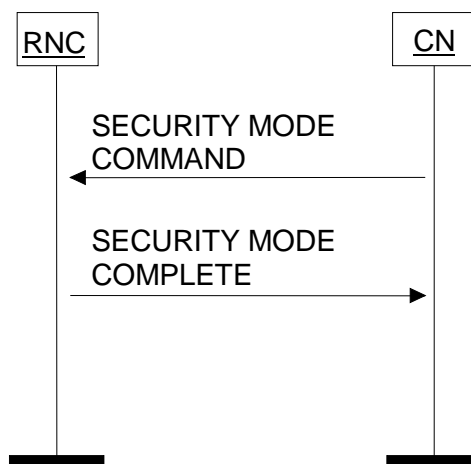## 8.18.2 Successful Operation

Figure 3: Security Mode Control procedure. Successful operation.

The CN shall start the procedure by sending to the UTRAN a SECURITY MODE COMMAND message. This message may contain the *Encryption Information* IE and shall contain the *Integrity Protection Information* IE, specifying, in preferred order with the most preferred first in the list, which ciphering, if any, and integrity protection algorithms may be used by the UTRAN.

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 algorithmif it cannot support any of the indicated UEAs. In the absence of the *Encryption Information* group IE in SECURITY MODE COMMAND message, the RNC shall handle it as not start ciphering encryption.

Upon reception of the SECURITY MODE COMMAND message, the UTRAN shall internally select appropriate algorithms, taking into account the UE/UTRAN capabilities. If a signalling connection already exists towards the other core network domain, and integrity protection and ciphering information has been received from that core network domain, the same algorithm(s) as being used for that core network domain shall be selected. This also means for encryption that if "no encryption" or no *Encryption Information* IE has been received from the first core network domain and ciphering has not been started, ciphering shall also not be started for the second core network domain. The UTRAN shall then trigger the execution of the corresponding radio interface procedure and, if applicable, start/restartinvoke the encryption device and also start/restart the integrity protection.

The CN may send a SECURITY MODE COMMAND message towards the RNC also when integrity protection and possibly ciphering has already been started for an existing signalling connection towards that core network domain. This may be used to activate new integrity protection and ciphering keys. The included integrity protection and ciphering information shall then support (at least) the integrity protection alternative and the ciphering alternative presently being used and the *Key Status* IE shall have the value "New".

When the execution of the radio interface procedure is successfully finished, UTRAN shall return a SECURITY MODE COMPLETE message to the CN. This message shall include the *Chosen Integrity Protection Algorithm* IE and may include the *Chosen Encryption Algorithm* IE.

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

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

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

8.18.3   Unsuccessful Operation

Figure 4: Security Mode Control procedure. Unsuccessful operation.

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

8.18.4   Abnormal Conditions

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

If, when establishing a signalling connection towards a second core network domain, the integrity protection and ciphering information specified in the SECURITY MODE COMMAND message does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be sent to the second core network domain with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection from that core nework domain and for which integrity protection and possibly ciphering has already been started, the *Key Status* IE has the value "Old", a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

If, upon reception of a SECURITY MODE COMMAND message from a core network domain with an already existing signalling connection and for which integrity protection and possibly ciphering has already been started, the included integrity protection and ciphering information does not support the integrity protection alternative and the ciphering alternative presently being used, a SECURITY MODE REJECT message shall be returned with cause value "Conflict with already existing Integrity protection and/or Ciphering information".

9.2.1.4   Cause

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

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			Invalid RAB Parameters Value(19),	
			Requested Maximum Bit Rate not Available(20),	
			Requested Maximum Bit Rate for DL not Available(33),	
			Requested Maximum Bit Rate for UL not Available(34),	
			Requested Guaranteed Bit Rate not Available(21),	
			Requested Guaranteed Bit Rate for DL not Available(35),	
			Requested Guaranteed Bit Rate for UL not Available(36),	
			Requested Transfer Delay not Achievable(22),	
			Invalid RAB Parameters Combination(23),	
			Condition Violation for SDU Parameters(24),	
			Condition Violation for Traffic Handling Priority(25),	
			Condition Violation for Guaranteed Bit Rate(26),	
			User Plane Versions not Supported(27),	
			Iu UP Failure(28),	
			TRELOCalloc Expiry (7),	
			Relocation Failure in Target CN/RNC or Target System	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(29),	
			Invalid RAB ID(30),	
			No remaining RAB(31),	
			Interaction with other procedure(32),	
			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	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			not allowed(50), Reduce Load in Serving Cell (51), No Radio Resources Available in Target cell (52))	

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice **Cause**				
			(…)	

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

Radio Network Layer cause	Meaning
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~~Change Of Ciphering And/Or Integrity Protection Is Not Supported~~	The action was not performed due to that the requested security mode configuration was in conflict with the already existing security mode configuration.~~The UTRAN and/or the UE are/is unable to support the requested change of ciphering and/or integrity protection algorithms.~~
Condition Violation For Guaranteed Bit Rate	The action was not performed due to condition violation for guaranteed bit rate.
Condition Violation For SDU Parameters	The action was not performed due to condition violation for SDU parameters.
Condition Violation For Traffic Handling Priority	The action was not performed due to condition violation for traffic handling priority.
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.
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.
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.
$T_{QUEUING}$ Expiry	The action failed due to expiry of the timer $T_{QUEUING}$.
$T_{RELOCalloc}$ Expiry	Relocation Resource Allocation procedure failed due to expiry of the timer $T_{RELOCalloc}$.
$T_{RELOCcomplete}$ Expiry	The reason for the action is expiry of timer $T_{RELOCcomplete}$.
$T_{RELOCoverall}$ Expiry	The reason for the action is expiry of timer $T_{RELOCoverall}$.
$T_{RELOCprep}$ Expiry	Relocation Preparation procedure is cancelled when timer $T_{RELOCprep}$ expires.
Unable To Establish During Relocation	RAB failed to establish during relocation because it cannot be supported in the target RNC.
Unknown Target RNC	Relocation rejected because the target RNC is not known to the CN.
User Inactivity	The action is requested due to user inactivity.
User Plane Versions Not Supported	The action failed because requested user plane versions were not supported.
RNC unable to establish all RFCs	RNC couldn't establish all RAB subflow combinations indicated within the *RAB Parameters* 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.

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

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

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

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

9.3.4   Information Element Definitions

```
-- ****************************************************************
--
-- Information Element Definitions
--
-- ****************************************************************

RANAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) ranap (0) version1 (1) ranap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxNrOfPDPDirections,
    maxNrOfPoints,
    maxNrOfRABs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,
    maxNrOfAltValues,

    id-MessageStructure,
    id-TypeOfError

    id-DownlinkCellLoadInformation,
    id-UplinkCellLoadInformation
FROM RANAP-Constants

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

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

-- A

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


-- 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 change-of-ciphering-and-or-integrity-protection-is-not-
supported (13),
    failure-in-the-radio-interface-procedure (14),
    release-due-to-utran-generated-reason (15),
    user-inactivity (16),
    time-critical-relocation (17),
    requested-traffic-class-not-available (18),
    invalid-rab-parameters-value (19),
    requested-maximum-bit-rate-not-available (20),
    requested-guaranteed-bit-rate-not-available (21),
    requested-transfer-delay-not-achievable (22),
    invalid-rab-parameters-combination (23),
    condition-violation-for-sdu-parameters (24),
    condition-violation-for-traffic-handling-priority (25),
```

```
    condition-violation-for-guaranteed-bit-rate (26),
    user-plane-versions-not-supported (27),
    iu-up-failure (28),
    relocation-failure-in-target-CN-RNC-or-target-system(29),
    invalid-RAB-ID (30),
    no-remaining-rab (31),
    interaction-with-other-procedure (32),
    requested-maximum-bit-rate-for-dl-not-available (33),
    requested-maximum-bit-rate-for-ul-not-available (34),
    requested-guaranteed-bit-rate-for-dl-not-available (35),
    requested-guaranteed-bit-rate-for-ul-not-available (36),
    repeated-integrity-checking-failure (37),
    requested-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),
    reduce-load-in-serving-cell (51),
    no-radio-resources-available-in-target-cell (52)
} (1..64)

CauseNon-Standard ::= INTEGER (129..256)

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

****   **LOTS OF UNAFFECTED ASN.1 DESCRIPTION FROM SECTION 9.3.4 REMOVED**   ****

3GPP TSG-RAN WG3 Meeting #29   *R3-021197*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

CR-Form-v3

CHANGE REQUEST

⌘	**25.413**	CR	**441**	⌘ rev	**-**	⌘	Current version:	**3.9.0**	⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Correction of Target RNC-ID	
Source: ⌘	R-WG3	
Work item code:⌘	TEI	***Date:*** ⌘ April 2002
Category: ⌘	**F**	***Release:*** ⌘ R99

Use one of the following categories: **F** *(essential correction)* **A** *(corresponds to a correction in an earlier release)* **B** *(Addition of feature),* **C** *(Functional modification of feature)* **D** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* 2 *(GSM Phase 2)* R96 *(Release 1996)* R97 *(Release 1997)* R98 *(Release 1998)* R99 *(Release 1999)* REL-4 *(Release 4)* REL-5 *(Release 5)*

Reason for change: ⌘	Tabular format for target RNC-ID is wrong according to the ASN.1 since it presents the IE as a choice instead of a sequence. It has to be aligned with the ASN.1.
Summary of change:⌘	Correction of tabular format to align with the ASN.1 description. Impact assessment towards the previous version of the specification (same release): This CR has no mpact since it aligns the tabular format with the asn.1.
Consequences if not approved: ⌘	Potential miscoding of the Target-RNC-ID with a choice instead of a pure sequence.

Clauses affected: ⌘	9.2.1.25	
Other specs affected:	⌘ **X** Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications	TS25413 CR442 REL-4 TS25413 CR443 REL-5
Other comments: ⌘		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

9.2.1.25   Target ID

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

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

3GPP TSG-RAN WG3 Meeting #29   *R3-021198*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

CR-Form-v3

CHANGE REQUEST

⌘	**25.413**	CR	**442**	⌘ rev	**-**	⌘	Current version:	**4.4.0**	⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Correction of Target RNC-ID
Source:	⌘	R-WG3
Work item code: ⌘	TEI	**Date:** ⌘ April 2002
Category:	⌘ **A**	**Release:** ⌘ REL-4

Use <u>one</u> of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change:	⌘	Tabular format for target RNC-ID is wrong according to the ASN.1 since it presents the IE as a choice instead of a sequence. It has to be aligned with the ASN.1.
Summary of change:	⌘	Correction of tabular format to align with the ASN.1 description. <u>Impact assessment towards the previous version of the specification (same release):</u> This CR has no mpact since it aligns the tabular format with the asn.1.
Consequences if not approved:	⌘	Potential miscoding of the Target-RNC-ID with a choice instead of a pure sequence.

Clauses affected:	⌘	9.2.1.25

Other specs affected:	⌘	**X**	Other core specifications	⌘	TS25413 CR441 R99
		☐	Test specifications		TS25413 CR443 REL-5
		☐	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

9.2.1.25   Target ID

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

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

3GPP TSG-RAN WG3 Meeting #29   *R3-021199*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

CR-Form-v3

CHANGE REQUEST

⌘   **25.413**   **CR** **443**   ⌘ rev **-** ⌘   Current version: **5.0.0** ⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Correction of Target RNC-ID
Source: ⌘	R-WG3

Work item code:⌘	TEI	**Date:** ⌘	April 2002
Category: ⌘	**A**	**Release:** ⌘	REL-5

Use <u>one</u> of the following categories:
   F *(essential correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(Addition of feature),*
   C *(Functional modification of feature)*
   D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
  2   *(GSM Phase 2)*
  R96 *(Release 1996)*
  R97 *(Release 1997)*
  R98 *(Release 1998)*
  R99 *(Release 1999)*
  REL-4 *(Release 4)*
  REL-5 *(Release 5)*

Reason for change: ⌘	Tabular format for target RNC-ID is wrong according to the ASN.1 since it presents the IE as a choice instead of a sequence. It has to be aligned with the ASN.1.
Summary of change:⌘	Correction of tabular format to align with the ASN.1 description. Impact assessment towards the previous version of the specification (same release): This CR has no mpact since it aligns the tabular format with the asn.1.
Consequences if not approved: ⌘	Potential miscoding of the Target-RNC-ID with a choice instead of a pure sequence.

Clauses affected: ⌘	9.2.1.25

Other specs affected:	⌘ **X**	Other core specifications ⌘	TS25413 CR441 R99 TS25413 CR442 REL-4
	☐	Test specifications	
	☐	O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

9.2.1.25 Target ID

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

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

CR-Form-v5

CHANGE REQUEST

| ⌘ | **25.413** CR **444** | ⌘ **rev** | **1** | ⌘ | Current version: | **5.0.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	SDU Format Information Presence
Source:	⌘	R-WG3
Work item code:	⌘ TEI	***Date:*** ⌘ May, 2002
Category:	⌘ **A**	***Release:*** ⌘ REL-5

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

Use <u>one</u> of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	Current definition for the presence of *SDU Format Information Parameter* IE in the *SDU Parameters* IE is defined as "present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'". The User Plane Mode information may not be available in the RAB ASSIGNMENT REQUEST message for a RAB modification, so the RAN3 error handling mechanisms would not be able to properly determine presence for the *SDU Format Information Parameter* IE based solely on the received message.

The IEs contained in the *SDU Format Information Parameter* IE are the *Subflow SDU Size* IE and *RAB Subflow Combination Bit Rate* IE. This would imply that this information is applicable for all traffic classes.

However, in TS 23.107 the SDU Format Information Parameter is not marked as relevant for the Interactive and Background traffic classes in the sections discussing these attributes (6.4.3.2 & 6.4.3.3). Since these attributes are not relevant for the Interactive and Background traffic classes it would not be appropriate to allow this combination in the RAB parameters. There is no definition for how these attributes should be used for the Interactive and Background traffic classes. |
| **Summary of change:** ⌘ | The condition for the presence of the SDU Format Information Parameter IE should be changed to optional with text added to the procedure sections indicating when the IE should be included. The IE should be present for RABs with User Plane Mode set to 'support mode for predefined SDU sizes' and whose traffic class is either 'Conversational' or 'Streaming'.

Impact Analysis:
Impact assessment towards the previous version of the specification (same release):
This CR has isolated impact with the previous version of the specification (same release) because the presence of the SDU Format Information Parameter IE could not be determined previously from the received message only if the User |

		Plane Mode information was not also included in the received message. It could also be misunderstood that the SDU Format Information Parameter IE was applicable for all traffic classes. This CR has an impact under a functional point of view.
Consequences if not approved:	⌘	There would be a misalignment for relevant attributes between TS 23.107 and TS 25.413. Additional unintended functional support for RAB parameter combinations not described by the Stage 2 specification (TS 23.107) would be expected but not defined. User Plane support for multiple subflow SDU sizes for unintended traffic classes would be needed. The RAN3 error handling mechanisms cannot determine the presence of the IE based on the received message only.

Clauses affected:	⌘	8.2.2, 8.7.2, 9.2.1.3, 9.3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.413 R99 CR 415, 25.413 R4 CR 416 None.
Other comments:	⌘			

How to create CRs using this form:

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

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

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

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

Table 2: Class 2

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

Table 3: Class 3

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

The following applies concerning interference between Elementary Procedures:

- The Reset procedure takes precedence over all other EPs.

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

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

8.2 RAB Assignment

8.2.1 General

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

8.2.2 Successful Operation
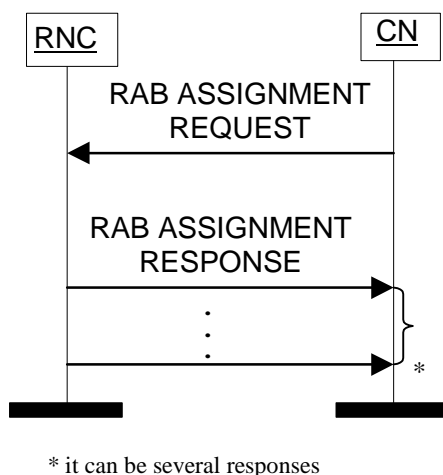

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i.e required User Plane Mode and required UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS)

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information.

- User Plane Information.

The *Transport Layer Information* IE may be present at a RAB modification except in the case when the only other present IE, besides the *RAB ID* IE, is the *NAS Synchronisation Indicator* IE.

At a RAB modification, the *RAB Pparameters* IE and the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value for this IE is requested to be modified.

At a RAB modification, the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value for this IE is requested to be modified.

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

If the *RAB Parameters* IE is present for a RAB modification, the *SDU Format Information Parameter* IE in the *RAB Parameters* IE shall be present only if the *Traffic Class* IE is set to either "Conversational" or "Streaming" and if

- either the User Plane mode is currently "support mode for pre-defined SDU sizes" and the *User Plane Mode* IE is not contained in the RAB ASSIGNMENT REQUEST message

- or if the *User Plane Mode* IE optionally contained within the RAB ASSIGNMENT REQUEST message is set to "support mode for pre-defined SDU sizes".

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

Upon reception of the RAB ASSIGNMENT REQUEST message UTRAN shall execute the requested RAB configuration. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

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

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

-   List of RABs successfully established or modified.

-   List of RABs released.

-   List of RABs queued.

-   List of RABs failed to establish or modify.

-   List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB:

-   setup/modified or

-   released or

-   queued or

-   failed to setup/modify or

-   failed to release.

If any alternative RAB parameter values have been used when establishing or modifying a RAB, these RAB parameter values shall be included in the RAB ASSIGNMENT RESPONSE message.

For the CS domain, when an ALCAP is used, UTRAN shall report the outcome of a specific RAB to establish or modify only after the transport network control plane signalling, which is needed for RAB establishment or modification, has been executed. At a RAB establishment, the transport network control plane signalling shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification when *Transport Layer Address* (IE) and *Iu Transport Association* IEs are included, the RNC shall establish a new transport bearer. The transport network control plane signalling shall then use the included *Transport Layer Address* IE and *Iu Transport Association* IE. Then the switch over to this new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode. If *Transport Layer Address* (IE) and *Iu Transport Association* IEs are not included, then the RNC may modify the already existing transport bearer.

For the PS domain or for the CS domain when an ALCAP is not used, for each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

Before reporting the successful outcome of a specific RAB to establish or modify, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. 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 Assignment shall fail with the cause value "RNC unable to establish all RFCs".

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer $T_{QUEUING}$.

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

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

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

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

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

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

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

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

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID

8.2.3   Unsuccessful Operation

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

8.2.4   Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

- *PDP Type Information*.

- *Data Volume Reporting Indication.*

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

   - for all queued RABs;

   - for RABs not already established or modified, and

   - for RABs not already released;

   with the cause "Relocation triggered".

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

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

   - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

8.6.5 Co-ordination of Two Iu Signalling Connections

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

For intersystem handover to GSM, 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 RELOCATION COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been initiated.

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

8.7 Relocation Resource Allocation

8.7.1 General

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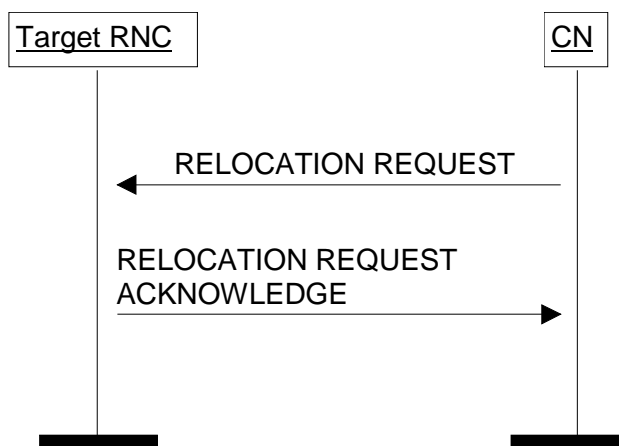
8.7.2 Successful Operation

Figure 7: Relocation Resource Allocation procedure. Successful operation.

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same RAB configuration as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

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

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

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

The RELOCATION REQUEST message shall contain following IEs

- *Permanent NAS UE Identity* IE (if available)

- *Cause*

- *CN Domain Indicator*

- *Source RNC To Target RNC Transparent Container*

- *Iu Signalling Connection Identifier*

- *Integrity Protection Information* IE (if available)

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

- *RAB-ID*

- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)

- *RAB parameters*

- *User Plane Information*

- *Transport Layer Address*

- *Iu Transport Association*

- *Data Volume Reporting Indication* (only for PS)

- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information*

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

- *Service Handover*.

- *Alternative RAB Parameter Values*.

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*

- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)

- *Priority level, queuing and pre-emption indication*

- *Service Handover*

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

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

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

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

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

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

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.

- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".

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

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

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

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

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

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

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

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

- *RAB ID*

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

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

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to by the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE .This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the target RNC supports cell load-based inter-system handover, then in the case of inter-system handover, the *New BSS to Old BSS Information* IE may be included in the RELOCATION REQUEST ACKNOWLEDGE message.

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

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

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

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

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".
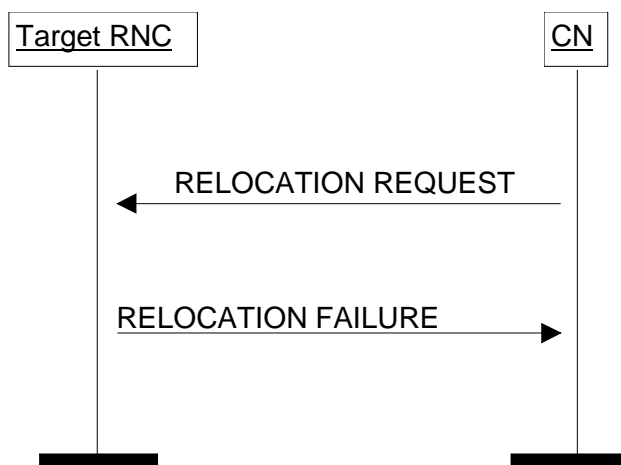
8.7.3 Unsuccessful Operation

Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.

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

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

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

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

- the *NewBSS to Old BSS Information* IE may be included in the RELOCATION FAILURE message.

- the RELOCATION FAILURE message may contain the appropriate value in the *Cause* IE, e.g. "No Radio Resources Available in Target Cell".

8.7.4 Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5 Co-ordination of Two Iu Signalling Connections

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

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

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- The target RNC shall ensure that there is no conflicting information in *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via different Iu signalling connections and related to the same relocation of SRNS.

- The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

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

9.2.1.3 RAB Parameters

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Traffic Class	M		ENUMERATED (conversational, streaming, interactive, background, ...)	**Desc.:** This IE indicates the type of application for which the Radio Access Bearer service is optimised
>RAB Asymmetry Indicator	M		ENUMERATED (Symmetric bidirectional, Asymmetric Uni directional downlink, Asymmetric Uni directional Uplink, Asymmetric Bidirectional, ...)	**Desc.:** This IE indicates asymmetry or symmetry of the RAB and traffic direction
>Maximum Bit Rate	M	1 to <nbr-SeparateTrafficDirections>	INTEGER (1..16,000,000)	**Desc.:** This IE indicates the maximum number of bits delivered by UTRAN and to UTRAN at a SAP within a period of time, divided by the duration of the period. The unit is: bit/s **Usage**: When nbr-SeparateTrafficDirections is equal to 2, then Maximum Bit Rate attribute for downlink is signalled first, then Maximum Bit Rate attribute for uplink
>Guaranteed Bit Rate	C-iftrafficConv-Stream	0 to <nbr-SeparateTrafficDirections>	INTEGER (0..16,000,000)	**Desc.:** This IE indicates the guaranteed number of bits delivered at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The unit is: bit/s **Usage:** 1. When nbr-SeparateTrafficDirections is equal to 2, then Guaranteed Bit Rate for downlink is signalled first, then Guaranteed Bit Rate for uplink 2. Delay and reliability attributes only apply up to the guaranteed bit rate 3. Conditional value for the case of Support Mode for pre-defined SDU sizes: Set to highest not rate controllable bitrate, where bitrate is either – one of the RAB subflow combination bitrate IEs (when present) or – one of the calculated values given when dividing

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
				the compound Subflow combination SDU sizes by the value of the IE Maximum SDU Size and then multiplying this result by the value of the IE Maximum Bit Rate.
>Delivery Order	M		ENUMERATED (delivery order requested, delivery order not requested)	**Desc:** This IE indicates whether the RAB shall provide in-sequence SDU delivery or not **Usage:** Delivery order requested: in sequence delivery shall be guaranteed by UTRAN on all RAB SDUs Delivery order not requested: in sequence delivery is not required from UTRAN
>Maximum SDU Size	M		INTEGER (0..32768)	**Desc.:** This IE indicates the maximum allowed SDU size The unit is: bit. **Usage:** Conditional value: Set to largest RAB Subflow Combination compound SDU size (when present) among the different RAB Subflow Combinations
>SDU parameters		1 to <maxRABSubflows>	See below	**Desc.:** This IE contains the parameters characterizing the RAB SDUs **Usage** Given per subflow with first occurence corresponding to subflow#1 etc…
>Transfer Delay	C-iftrafficConv-Stream		INTEGER (0..65535)	**Desc.:** This IE indicates the maximum delay for 95th percentile of the distribution of delay for all delivered SDUs during the lifetime of a RAB, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP The unit is: millisecond. **Usage:** -
>Traffic Handling Priority	C - iftrafficInteractiv		INTEGER {spare (0), highest (1), .., lowest (14), no priority (15)} (0..15)	**Desc.:** This IE specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers **Usage:** Values between 1 and 14 are ordered in decreasing order of priority, '1' being the highest and '14' the lowest. Value 0 shall be treated as a logical error if received.
>Allocation/Retention priority	O		See below	**Desc.:** This IE specifies the relative importance compared to other Radio access bearers for allocation and retention of the Radio access bearer. **Usage:** If this IE is not received, the request is regarded as it cannot trigger the pre-emption process and it is vulnerable to the pre-emption process.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RAB parameters				
>Source Statistics Descriptor	C-iftrafficConv-Stream		ENUMERATED (speech, unknown, …)	**Desc.:** This IE specifies characteristics of the source of submitted SDUs **Usage:** -
>Relocation Requirement	O		ENUMERATED (lossless, none, …, realtime)	This IE shall be present for RABs towards the PS domain, otherwise it shall not be present. **Desc.:** This IE is no longer used. **Usage:** It shall always be set to "none" when sent and it shall always be ignored when received.

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

Range Bound	Explanation
maxRABSubflows	Maximum number of Subflows per RAB. Value is 7

Condition	Explanation
IftrafficConv-Stream	This IE shall be present if the *Traffic Class* IE is set to "Conversational" or "Streaming"
IftrafficInteractiv	This IE shall be present if the *Traffic Class* IE is set to "Interactive"

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SDU parameters				
> SDU Error Ratio	C-ifErroneousSDU			**Desc.:** This IE indicates the fraction of SDUs lost or detected as erroneous. This is a Reliability attribute **Usage:** The attribute is coded as follows: Mantissa * 10 $^{-\text{exponent}}$
>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..6)	
>Residual Bit Error Ratio	M			**Desc.:** This IE indicates the undetected bit error ratio for each subflow in the delivered SDU. This is a Reliability attribute. **Usage:** The attribute is coded as follows: Mantissa * 10 $^{-\text{exponent}}$

>>Mantissa	M		INTEGER (1..9)	
>>Exponent	M		INTEGER (1..8)	
>Delivery Of Erroneous SDU	M		ENUMERATED (yes, no, no-error-detection-consideration)	**Desc.:** This IE indicates whether SDUs with detected errors shall be delivered or not. In case of unequal error protection, the attribute is set per subflow This is a Reliability attribute **Usage:** Yes: error detection applied, erroneous SDU delivered No. Error detection is applied , erroneous SDU discarded no-error-detection-consideration: SDUs delivered without considering error detection. If the RNC receives this IE set to 'Yes' and the *User Plane Mode* IE is set to 'transparent mode', it should consider it as 'no-error-detection-consideration'.
>SDU format information Parameter	~~C – IfSMPredefinedSDUSize~~O	1 to <maxRABSubflow Combinations>	See below	**Desc.:** This IE contains the list of possible exact sizes of SDUs and/or RAB Subflow Combination bit rates. Given per RAB Subflow Combination with first occurence corresponding to RAB Subflow Combination number 1. It shall always be present for rate controllable RABs.

Range Bound	Explanation
maxRABSubflowCombinations	Maximum number of RAB Subflow Combinations. Value is 64.

Condition	Explanation
IfErroneousSDU	This IE shall be present if the *Delivery Of Erroneous SDU* IE is set to "Yes" or "No".
~~IfSMPredefinedSDUSize~~	~~This IE shall be present for RABs with the IE User Plane Mode set to 'support mode for pre-defined SDU sizes'.~~

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

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

9.2.1.4   Cause

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

9.3.4 Information Element Definitions

```
    rAB-AsymmetryIndicator        RAB-AsymmetryIndicator,
    maxBitrate          RAB-Parameter-MaxBitrateList,
    guaranteedBitRate        RAB-Parameter-GuaranteedBitrateList OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Conversational" or "Streaming" --,
    deliveryOrder           DeliveryOrder,
    maxSDU-Size          MaxSDU-Size,
    sDU-Parameters          SDU-Parameters,
    transferDelay          TransferDelay OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Conversational" or "Streaming" --,
    trafficHandlingPriority     TrafficHandlingPriority OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Interactive" --,
    allocationOrRetentionPriority   AllocationOrRetentionPriority OPTIONAL,
    sourceStatisticsDescriptor  SourceStatisticsDescriptor OPTIONAL
    -- This IE shall be present the traffic class IE is set to "Conversational" or "Streaming" --,
    relocationRequirement   RelocationRequirement OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {RAB-Parameters-ExtIEs} } OPTIONAL,
    ...
}

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

RAB-SubflowCombinationBitRate   ::= INTEGER (0..16000000)

RAB-TrCH-Mapping ::=    SEQUENCE ( SIZE (1..maxNrOfRABs)) OF
    RAB-TrCH-MappingItem

RAB-TrCH-MappingItem ::= SEQUENCE {
    rAB-ID          RAB-ID,
    trCH-ID-List    TrCH-ID-List,
    ...
}

RAC                ::= OCTET STRING (SIZE (1))

RAI ::= SEQUENCE {
    lAI          LAI,
    rAC          RAC,
    iE-Extensions          ProtocolExtensionContainer { {RAI-ExtIEs} } OPTIONAL,
    ...
}

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

```
RateControlAllowed ::= ENUMERATED {
    not-allowed,
    allowed
}

RealTimeLoad    ::= INTEGER (0..100)

RelocationRequirement ::= ENUMERATED {
    lossless,
    none,
    ...,
    realtime
}

RelocationType ::= ENUMERATED {
    ue-not-involved,
    ue-involved,
    ...
}

RepetitionNumber0 ::= INTEGER (0..255)

RepetitionNumber1 ::= INTEGER (1..256)


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

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

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

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

Requested-RAB-Parameter-Values-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

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

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


RequestType ::= SEQUENCE {
    event               Event,
    reportArea          ReportArea,
    horizontalAccuracyCode    INTEGER (0..127)    OPTIONAL,
    ... ,
    verticalAccuracyCode          INTEGER (0..127)    OPTIONAL,
    -- To be used if Geographical Coordinates shall be reported with a requested accuracy. --
    responseTime                  ResponseTime    OPTIONAL,
    -- This IE shall be present if the Event IE is set to 'Direct' and the Report Area IE is set to 'Geographical Area'. --
    positioningPriority           PositioningPriority OPTIONAL,
    -- This IE shall be present if the Event IE is set to 'Direct' or "Change of Service Area". --
    clientType                    ClientType  OPTIONAL
    -- This IE shall be present if the Event IE is set to 'Direct'. --
}

ResidualBitErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..8),
    iE-Extensions       ProtocolExtensionContainer { {ResidualBitErrorRatio-ExtIEs} } OPTIONAL
}
-- ResidualBitErrorRatio = mantissa * 10^-exponent

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

ResponseTime    ::= ENUMERATED {
    lowdelay,
    delaytolerant,
...
}

RNC-ID              ::= INTEGER (0..4095)
-- RNC-ID               ::= BIT STRING (SIZE (12))
-- Harmonized with RNSAP and NBAP definitions

RRC-Container               ::= OCTET STRING

-- S

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

SAI ::= SEQUENCE {
    pLMNidentity            PLMNidentity,
    lAC             LAC,
    sAC             SAC,
    iE-Extensions       ProtocolExtensionContainer { {SAI-ExtIEs} } OPTIONAL
}
```

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

SAPI ::= ENUMERATED {
    sapi-0,
    sapi-3,
    ...
}

SDU-ErrorRatio ::= SEQUENCE {
    mantissa            INTEGER (1..9),
    exponent            INTEGER (1..6),
    iE-Extensions            ProtocolExtensionContainer { {SDU-ErrorRatio-ExtIEs} } OPTIONAL
}
-- SDU-ErrorRatio = mantissa * 10^-exponent

SDU-ErrorRatio-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}
SDU-FormatInformationParameters ::= SEQUENCE (SIZE (1..maxRAB-SubflowCombination)) OF
    SEQUENCE {
        subflowSDU-Size          SubflowSDU-Size    OPTIONAL,
        rAB-SubflowCombinationBitRate    RAB-SubflowCombinationBitRate    OPTIONAL,
        iE-Extensions            ProtocolExtensionContainer { {SDU-FormatInformationParameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-FormatInformationParameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

SDU-Parameters ::= SEQUENCE (SIZE (1..maxRAB-Subflows)) OF
    SEQUENCE {
        sDU-ErrorRatio          SDU-ErrorRatio OPTIONAL
        -- This IE shall be present if the Delivery Of Erroneous SDU IE is set to "Yes" or "No" --,
        residualBitErrorRatio        ResidualBitErrorRatio,
        deliveryOfErroneousSDU      DeliveryOfErroneousSDU,
        sDU-FormatInformationParameters SDU-FormatInformationParameters OPTIONAL
        -- This IE shall be present for RABs with the IE User Plane Mode set to support mode for predefined SDU sizes --,
        iE-Extensions            ProtocolExtensionContainer { {SDU-Parameters-ExtIEs} } OPTIONAL,
        ...
    }

SDU-Parameters-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

Service-Handover ::= ENUMERATED {
    handover-to-GSM-should-be-performed,
```

CR-Form-v5

CHANGE REQUEST

| ⌘ | **25.413** | **CR** | **449** | ⌘**rev** | **-** | ⌘ | Current version: | **3.9.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Extension Container Indications	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 29 April 2002
Category: ⌘	**F**	***Release:*** ⌘ R99

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

Use <u>one</u> of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	Currently this is not possible to distinguish or recognize extensions that were added in different releases and for different reasons (R99 corrections, new R5 features) within all the different extension containers in the ASN.1.
Summary of change: ⌘	Add a generic indication (informative comment) for all those extensions in the ASN.1. <u>Impact assessment towards the previous version of the specification (same release):</u> This CR has no impact because the changes are purely editiorial.
Consequences if not approved: ⌘	This will lead to an incremental difficulty for readers to catch the full picture of one ASN.1 message or IE when those would mix extensions coming from different releases (Release 99, 4, 5, 6, …)

Clauses affected: ⌘	9.3.3, 9.3.4
Other specs affected: ⌘ **X**	Other core specifications ⌘ 25.413 V4.4.0 CR450 25.413 V5.0.0 CR451
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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

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

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

9.3.3 PDU Definitions

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
 OverloadExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable the indication to the RNC which CN domain is suffering the signalling traffic overload --
    { ID id-CN-DomainIndicator         CRITICALITY ignore  EXTENSION CN-DomainIndicator    PRESENCE optional } ,
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

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
```

```
Lots of unaffected ASN1 in 9.3.4 not shown
```

```
CriticalityDiagnostics-IE-List-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable reporting the message structure down to the erroneous IE --
    {   ID id-MessageStructure   CRITICALITY ignore     EXTENSION MessageStructure  PRESENCE optional   }|
-- Extension for Release 99 to enable reporting if a reported error is due to a not understood or a missing IE --
    {   ID id-TypeOfError        CRITICALITY ignore     EXTENSION TypeOfError        PRESENCE mandatory },
    ...
}
```

```
Lots of unaffected ASN1 in 9.3.4 not shown
```

CR-Form-v5

CHANGE REQUEST

| ⌘ | **25.413** | CR | **450** | ⌘rev | **-** | ⌘ | Current version: | **4.4.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Extension Container Indications	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 29 April 2002

Category: ⌘	**F**	***Release:*** ⌘ REL-4

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

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	Currently this is not possible to distinguish or recognize extensions that were added in different releases and for different reasons (R99 corrections, new R5 features) within all the different extension containers in the ASN.1.
Summary of change: ⌘	Add a generic indication (informative comment) for all those extensions in the ASN.1. <u>Impact assessment towards the previous version of the specification (same release):</u> This CR has no impact because the changes are purely editiorial.
Consequences if not approved: ⌘	This will lead to an incremental difficulty for readers to catch the full picture of one ASN.1 message or IE when those would mix extensions coming from different releases (Release 99, 4, 5, 6, …)

Clauses affected: ⌘	9.3.3, 9.3.4

Other specs ⌘	**X**	Other core specifications ⌘	25.413 V3.9.0 CR449 25.413 V5.0.0 CR451
affected:	☐	Test specifications	
	☐	O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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

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

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

9.3.3   PDU Definitions

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupItem-RelocReq-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {ID id-Alt-RAB-Parameters    CRITICALITY ignore      EXTENSION Alt-RAB-Parameters      PRESENCE optional},
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupItem-RelocReqAck-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {ID id-Ass-RAB-Parameters    CRITICALITY ignore      EXTENSION Ass-RAB-Parameters      PRESENCE optional } ,
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
LocationReportExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable report of Last Known Service Area with its Age over Iu --
    { ID id-LastKnownServiceArea    CRITICALITY ignore  EXTENSION LastKnownServiceArea  PRESENCE optional},
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
OverloadExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable the indication to the RNC which CN domain is suffering the signalling traffic overload --
    { ID id-CN-DomainIndicator          CRITICALITY ignore  EXTENSION CN-DomainIndicator    PRESENCE optional } ,
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupOrModifyItemSecond-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {   ID id-Alt-RAB-Parameters    CRITICALITY ignore     EXTENSION Alt-RAB-Parameters       PRESENCE optional  },
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupOrModifiedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {   ID id-Ass-RAB-Parameters    CRITICALITY ignore     EXTENSION Ass-RAB-Parameters       PRESENCE optional  },
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

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
```

```
Lots of unaffected ASN1 in 9.3.4 not shown
```

```
CriticalityDiagnostics-IE-List-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable reporting the message structure down to the erroneous IE --
    {   ID id-MessageStructure   CRITICALITY ignore      EXTENSION MessageStructure  PRESENCE optional   }|
-- Extension for Release 99 to enable reporting if a reported error is due to a not understood or a missing IE --
    {   ID id-TypeOfError         CRITICALITY ignore      EXTENSION TypeOfError        PRESENCE mandatory  },
    ...
}
```

```
Lots of unaffected ASN1 in 9.3.4 not shown
```

CR-Form-v5

CHANGE REQUEST

| ⌘ | **25.413** | **CR** | **451** | ⌘**rev** | **-** | ⌘ | Current version: | **5.0.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	Extension Container Indications	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 29 April 2002

Category: ⌘	**A**	***Release:*** ⌘ REL-5

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

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	Currently this is not possible to distinguish or recognize extensions that were added in different releases and for different reasons (R99 corrections, new R5 features) within all the different extension containers in the ASN.1.
Summary of change: ⌘	Add a generic indication (informative comment) for all those extensions in the ASN.1. <u>Impact assessment towards the previous version of the specification (same release):</u> This CR has no impact because the changes are purely editiorial.
Consequences if not approved: ⌘	This will lead to an incremental difficulty for readers to catch the full picture of one ASN.1 message or IE when those would mix extensions coming from different releases (Release 99, 4, 5, 6, …)

Clauses affected: ⌘	9.3.3, 9.3.4

Other specs ⌘	**X**	Other core specifications	⌘	25.413 V3.9.0 CR449 25.413 V4.4.0 CR450
affected:		Test specifications		
		O&M Specifications		

Other comments: ⌘	

How to create CRs using this form:

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

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

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

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

9.3.3   PDU Definitions

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupItem-RelocReq-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {ID id-Alt-RAB-Parameters   CRITICALITY ignore     EXTENSION Alt-RAB-Parameters     PRESENCE optional},
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
RAB-SetupItem-RelocReqAck-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {ID id-Ass-RAB-Parameters   CRITICALITY ignore     EXTENSION Ass-RAB-Parameters     PRESENCE optional } ,
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
LocationReportExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable report of Last Known Service Area with its Age over Iu --
    { ID id-LastKnownServiceArea    CRITICALITY ignore  EXTENSION LastKnownServiceArea  PRESENCE optional},
    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
OverloadExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable the indication to the RNC which CN domain is suffering the signalling traffic overload --
    { ID id-CN-DomainIndicator         CRITICALITY ignore  EXTENSION CN-DomainIndicator    PRESENCE optional } ,
-- Extension for Release 5 to enable NNSF --
    { ID id-GlobalCN-ID                CRITICALITY ignore  EXTENSION GlobalCN-ID           PRESENCE optional } ,
    ...
}
```

```
Lots of unaffected ASN1 in 9.3.3 not shown
```

```
RAB-SetupOrModifyItemSecond-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {   ID id-Alt-RAB-Parameters    CRITICALITY ignore     EXTENSION Alt-RAB-Parameters       PRESENCE optional  },
    ...
}
```

```
Lots of unaffected ASN1 in 9.3.3 not shown
```

```
RAB-SetupOrModifiedItem-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable RAB Quality of Service negotiation over Iu --
    {   ID id-Ass-RAB-Parameters    CRITICALITY ignore     EXTENSION Ass-RAB-Parameters       PRESENCE optional  },
    ...
}
```

```
Lots of unaffected ASN1 in 9.3.3 not shown
```

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
```

Lots of unaffected ASN1 in 9.3.4 not shown

```
CriticalityDiagnostics-IE-List-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 99 to enable reporting the message structure down to the erroneous IE --
    {   ID id-MessageStructure  CRITICALITY ignore     EXTENSION MessageStructure  PRESENCE optional   }|
-- Extension for Release 99 to enable reporting if a reported error is due to a not understood or a missing IE --
    {   ID id-TypeOfError       CRITICALITY ignore     EXTENSION TypeOfError       PRESENCE mandatory },
    ...
}
```

Lots of unaffected ASN1 in 9.3.4 not shown

3GPP TSG-RAN WG3 Meeting #29
Gyeongju, Korea, 13-17 May 2002

R3-021529

CR-Form-v3

CHANGE REQUEST

| ⌘ | **25.413** | CR | **460** | ⌘ | rev | **r1** | ⌘ | Current version: | **3.9.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	RNL-TNL coordination in RANAP	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 14 May 2002
Category: ⌘	**F**	***Release:*** ⌘ R-99

Use <u>one</u> of the following categories:
F (essential correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	In RAB Assignment and Iu Release procedures, the procedural text specifies timing interactions between RNL procedures and TNL procedures. Whereas it is normal to specify that information piggy-backed on RANAP messages have to be used by the TNL, RANAP specifications should not specify RNL/TNL timing interactions. The intention in RAB Assignment and Iu Release procedure was to specify the timing interactions between RANAP and Iu User Plane procedures; this should be corrected.
Summary of change: ⌘	Procedural text is changed in order to specify the timing interactions between RANAP and Iu User Plane procedures rather than between RNL and TNL. Impact assessment towards the previous version of the specification (same release): - This CR has isolated impact with the previous version of the specification because this CR remove the ambiguity on RNL-TNL interactions for which the specification is ambiguous. - This CR has an impact under functional point of view. - The impact can be considered isolated because the change only affects RAB Assignment and Iu Release procedures.
Consequences if not approved: ⌘	Ambiguities can remain in the specifications and could lead to incorrect implementations.

Clauses affected: ⌘	8.2, 8.5
Other specs affected: ⌘	**X** Other core specifications ⌘ 25.413 REL-4 CR 461 ☐ Test specifications 25.413 REL-5 CR 462 ☐ O&M Specifications

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:
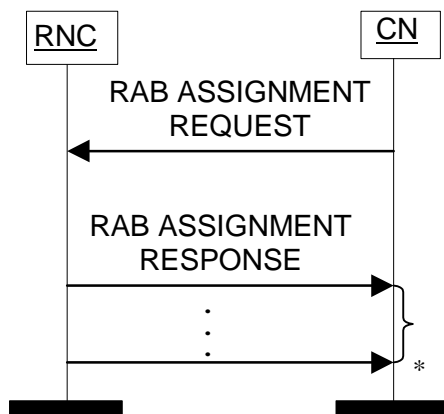
1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.2 RAB Assignment

8.2.1 General

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

8.2.2 Successful Operation

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i e User Plane Mode and UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS)

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information.

- User Plane Information.

The *Transport Layer Information* IE may be present at a RAB modification except in the case when the only other present IE, besides the RAB ID IE, is the *NAS Synchronisation Indicator* IE.

At a RAB modification, the *RAB parameter* IE and the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value is requested to be modified.

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

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

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

- The priority levels and the pre-emption indicators may (singularly or in combination) be used to determine whether the RAB assignment has to be performed unconditionally and immediately. If the requested RAB is marked as "may trigger pre-emption" and the resource situation so requires, RNC may trigger the pre-emption procedure which may then cause the forced release of a lower priority RAB which is marked as "pre-emptable".

Whilst the process and the extent of the pre-emption procedure is operator dependent, the pre-emption indicators, if given in the RAB ASSIGNMENT REQUEST message, shall be treated as follows:

1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB:

- setup/modified or;

- released or;

- queued or;

- failed to setup/modify or;

- failed to release.

For the CS domain, UTRAN shall report the successful outcome of a specific RAB to establish or modify only after the Iu user plane at RNL level transport network control plane signalling, which is needed for RAB establishment or modification, has been executed is ready to be used in UL and DL. The transport network control plane signalling required to set up the transport bearer shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification, it is up to the RNC to decide if any transport network control plane signalling shall be performed a new transport bearer shall be set up for the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE or if the already existing transport bearer shall be used. If the RNC decides to establish a new transport bearer, the transport network control plane signalling shall use the included *Transport Layer Address* IE and *Iu Transport Association* IE. Tthen the switch over to this new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode. If no Transport Layer Information was included in the RAB ASSIGNMENT REQUEST message at a RAB modification, no transport network control plane signalling shall occur.

For each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

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

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer T$_{QUEUING}$.

For the queued RABs, indicated in the first RAB ASSIGNMENT RESPONSE message, UTRAN shall report the outcome of the queuing for every RAB individually or for several RABs in subsequent RAB ASSIGNMENT

RESPONSE message(s). This is left to implementation. UTRAN shall stop T$_{QUEUING}$ when all RABs have been either successfully established or modified or failed to establish or modify. The RAB Assignment procedure is then terminated both in CN and UTRAN when all RABs have been responded to.

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

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

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

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

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

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

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

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID.

8.2.3   Unsuccessful Operation

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

8.2.4   Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

-   *PDP Type Information*.

-   *Data Volume Reporting Indication*.

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

   - for all queued RABs;

   - for RABs not already established or modified, and

   - for RABs not already released;

   with the cause "Relocation triggered".

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

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

   - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

Next change

8.5 Iu Release

8.5.1 General

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

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

- Completion of transaction between UE and CN.

- UTRAN generated reasons, e.g. reception of IU RELEASE REQUEST message.

- Completion of successful relocation of SRNS.

- Cancellation of relocation after successful completion of the Relocation Resource Allocation procedure.
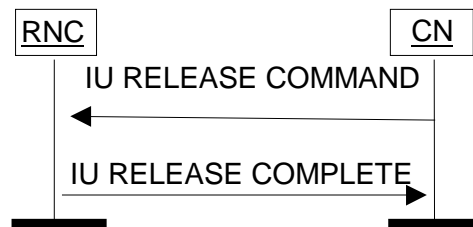
8.5.2 Successful Operation

Figure 2: Iu Release procedure. Successful operation.

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

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

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

When the RNC receives the IU RELEASE COMMAND message:

1. Clearing of the related UTRAN resources is initiated. However, the UTRAN shall not clear resources related to other Iu signalling connections the UE might have. The Iu transport bearers for RABs subject to data forwarding and other UTRAN resources used for the GTP-PDU forwarding process, are released by the RNC only when the timer $T_{DATAfwd}$ expires.

2. The RNC returns any assigned Iu user plane resources to idle i.e. neither uplink user data nor downlink user data can be transferred over the Iu interface anymore. Then the RNC sends an IU RELEASE COMPLETE message to the CN. (The RNC does not need to wait for the release of UTRAN radio resources or for the transport network layer signalling to be completed before returning the IU RELEASE COMPLETE message.) When an IU RELEASE COMPLETE message is sent, the procedure is terminated in the UTRAN.

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

If the release was initiated by UTRAN, for each RAB towards the PS domain, for which the *DL GTP-PDU Sequence Number* IE and/or the *UL GTP-PDU Sequence Number* IE are (is) available, the RNC shall include the available sequence number(s) in the *RABs Released Item* IE (within the *RAB Released List* IE) in the IU RELEASE COMPLETE message.

The *RAB Release Item* IE shall not be present if there is no sequence number to be reported for that RAB.

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

8.5.3 Abnormal Conditions

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

3GPP TSG-RAN WG3 Meeting #29
Gyeongju, Korea, 13-17 May 2002

R3-021530

CR-Form-v3

CHANGE REQUEST

| ⌘ | **25.413** | CR | **461** | ⌘ | rev | **r1** | ⌘ | Current version: | **4.3.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title: ⌘	RNL-TNL coordination in RANAP	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 29 March 2002
Category: ⌘	**A**	***Release:*** ⌘ REL-4

Use one of the following categories:	*Use one of the following releases:*
F *(essential correction)*	*2* *(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96* *(Release 1996)*
B *(Addition of feature),*	*R97* *(Release 1997)*
C *(Functional modification of feature)*	*R98* *(Release 1998)*
D *(Editorial modification)*	*R99* *(Release 1999)*
Detailed explanations of the above categories can	*REL-4* *(Release 4)*
be found in 3GPP TR 21.900.	*REL-5* *(Release 5)*

Reason for change: ⌘	In RAB Assignment and Iu Release procedures, the procedural text specifies timing interactions between RNL procedures and TNL procedures. Whereas it is normal to specify that information piggy-backed on RANAP messages have to be used by the TNL, RANAP specifications should not specify RNL/TNL timing interactions. The intention in RAB Assignment and Iu Release procedure was to specify the timing interactions between RANAP and Iu User Plane procedures; this should be corrected.
Summary of change: ⌘	Procedural text is changed in order to specify the timing interactions between RANAP and Iu User Plane procedures rather than between RNL and TNL. Impact assessment towards the previous version of the specification (same release): - This CR has isolated impact with the previous version of the specification because this CR remove the ambiguity on RNL-TNL interactions for which the specification is ambiguous. - This CR has an impact under functional point of view. - The impact can be considered isolated because the change only affects RAB Assignment and Iu Release procedures.
Consequences if ***not approved:*** ⌘	Ambiguities can remain in the specifications and could lead to incorrect implementations.

Clauses affected: ⌘	8.2, 8.5

Other specs ***affected:***	⌘	**X**	Other core specifications	⌘	25.413 R99 CR 460
		☐	Test specifications		25.413 REL-5 CR462
		☐	O&M Specifications		

Other comments: ⌘	

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.2 RAB Assignment

8.2.1 General

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

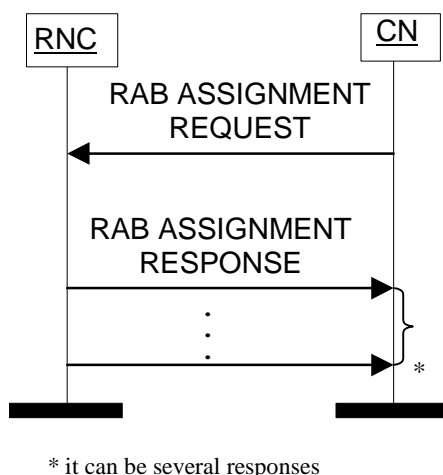## 8.2.2 Successful Operation

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i.e required User Plane Mode and required UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS)

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of handover from GPRS to UMTS or when establishing a RAB for an existing PDP context).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of handover from GPRS to UMTS or when establishing a RAB for an existing PDP context).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of handover from GPRS to UMTS).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of handover from GPRS to UMTS).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information .

- User Plane Information.

The *Transport Layer Information* IE may only be present if at least one more IE than the *RAB ID* IE and the *NAS Synchronisation Indicator* IE is also included.

At a RAB modification, the *RAB parameter* IE and the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value is requested to be modified.

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

Upon reception of the RAB ASSIGNMENT REQUEST message UTRAN shall execute the requested RAB configuration. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

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

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB

- setup/modified or

- released or

- queued or

- failed to setup/modify or

- failed to release.

If any alternative RAB parameter values have been used when establishing or modifying a RAB, these RAB parameter values shall be included in the RAB ASSIGNMENT RESPONSE message.

For the CS domain, UTRAN shall report the successful outcome of a specific RAB to establish or modify only after the Iu user plane at RNL leveltransport network control plane signalling, which is needed for RAB establishment or modification, has been executed is ready to be used in UL and DL. At a RAB establishment, the transport network control plane signalling required to set up the transport bearer shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification, it is up to the RNC to decide if any transport network control plane signalling shall be performeda new transport bearer shall be set up or if the already existing transport bearer shall be used. If the RNC decides to establish a new transport bearer, the transport network control plane signalling shall use the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE. Then the switch over to this new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode. If the RNC decides to modify the already existing transport bearer, the transport network control plane signalling shall not use the possibly included *Transport Layer Address* IE and *Iu Transport Association* IE. That is, re-binding with *Iu Transport Association* IE shall not be done.

For each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

Before reporting the successful outcome of a specific RAB to establish or modify, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC is requested to execute the user plane initialisation for the *User Plane Mode* "support mode for predefined SDU sizes", it shall initialise all RAB subflow combinations on Iu as indicated in the *RAB parameters* IE. If not all of the indicated RAB subflow combinations can be initialised the RAB Assignment fails with the cause value "RNC unable to establish all RFCs". The user plane initialisation is described in ref.[6].

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer $T_{QUEUING}$.

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

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

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

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

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

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

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

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

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID

8.2.3 Unsuccessful Operation

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

8.2.4 Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the

corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

- *PDP Type Information*.

- *Data Volume Reporting Indication*.

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

    - for all queued RABs;

    - for RABs not already established or modified, and

    - for RABs not already released;

    with the cause "Relocation triggered".

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

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

    - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message

8.5 Iu Release

8.5.1 General

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

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

- Completion of transaction between UE and CN.

- UTRAN generated reasons, e.g. reception of IU RELEASE REQUEST message.

- Completion of successful relocation of SRNS.

- Cancellation of relocation after successful completion of the Relocation Resource Allocation procedure.

8.5.2 Successful Operation

RNC   CN

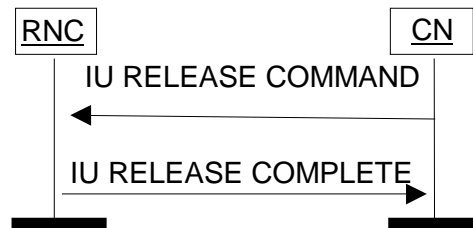IU RELEASE COMMAND

IU RELEASE COMPLETE

Figure 2: Iu Release procedure. Successful operation.

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

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

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

When the RNC receives the IU RELEASE COMMAND message:

1. Clearing of the related UTRAN resources is initiated. However, the UTRAN shall not clear resources related to other Iu signalling connections the UE might have. The Iu transport bearers for RABs subject to data forwarding and other UTRAN resources used for the GTP-PDU forwarding process, are released by the RNC only when the timer $T_{DATAfwd}$ expires.

2. The RNC returns any assigned Iu user plane resources to idle i.e. neither uplink user data nor downlink user data can be transferred over the Iu interface anymore. Then the RNC sends an IU RELEASE COMPLETE message to the CN. (The RNC does not need to wait for the release of UTRAN radio resources or for the transport network layer signalling to be completed before returning the IU RELEASE COMPLETE message.) When an IU RELEASE COMPLETE message is sent, the procedure is terminated in the UTRAN.

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

If the release was initiated by UTRAN, for each RAB towards the PS domain, for which the *DL GTP-PDU Sequence Number* IE and/or the *UL GTP-PDU Sequence Number* IE are (is) available, the RNC shall include the available sequence number(s) in the *RABs Released Item* IE (within the *RAB Released List* IE) in the IU RELEASE COMPLETE message.

The *RAB Release Item* IE shall not be present if there is no sequence number to be reported for that RAB.

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

8.5.3 Abnormal Conditions

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

3GPP TSG-RAN WG3 Meeting #29
Gyeongju, Korea, 13-17 May 2002

R3-021531

CR-Form-v3

CHANGE REQUEST

⌘	**25.413**	CR **462**	⌘ rev **r1**	⌘	Current version:	**5.0.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	RNL-TNL coordination in RANAP
Source:	⌘	R-WG3
Work item code: ⌘	TEI	*Date:* ⌘ 29 March 2002
Category:	⌘ **A**	*Release:* ⌘ REL-5

Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	In RAB Assignment and Iu Release procedures, the procedural text specifies timing interactions between RNL procedures and TNL procedures. Whereas it is normal to specify that information piggy-backed on RANAP messages have to be used by the TNL, RANAP specifications should not specify RNL/TNL timing interactions. The intention in RAB Assignment and Iu Release procedure was to specify the timing interactions between RANAP and Iu User Plane procedures; this should be corrected.
Summary of change: ⌘		Procedural text is changed in order to specify the timing interactions between RANAP and Iu User Plane procedures rather than between RNL and TNL. Impact assessment towards the previous version of the specification (same release): - This CR has isolated impact with the previous version of the specification because this CR remove the ambiguity on RNL-TNL interactions for which the specification is ambiguous. - This CR has an impact under functional point of view. - The impact can be considered isolated because the change only affects RAB Assignment and Iu Release procedures.
Consequences if *not approved:*	⌘	Ambiguities can remain in the specifications and could lead to incorrect implementations.

Clauses affected:	⌘	8.2, 8.5

Other specs *affected:*	⌘ **X**	Other core specifications	⌘	25.413 R-99 CR 460
	☐	Test specifications		25.413 REL-4 CR 461
	☐	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.2 RAB Assignment

8.2.1 General

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

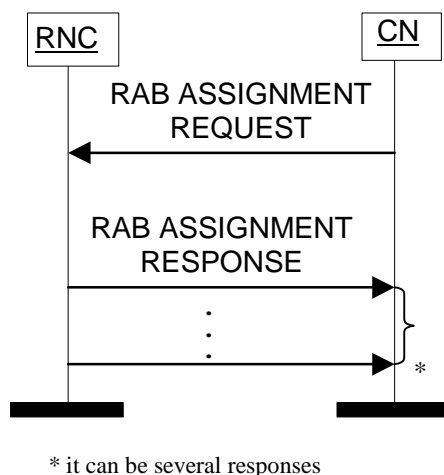## 8.2.2 Successful Operation

* it can be several responses

Figure 1: RAB Assignment procedure. Successful operation.

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

The CN may request UTRAN to:

- establish,

- modify,

- release

one or several RABs with one RAB ASSIGNMENT REQUEST message.

The CN shall include in the RAB ASSIGNMENT REQUEST message at least one request to either establish/modify or release a RAB.

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

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

- list of RABs to release.

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

- RAB ID.

- NAS Synchronisation Indicator (only when available).

- RAB parameters (including e.g. Allocation/Retention Priority).

- User Plane Information (i.e required User Plane Mode and required UP Mode Versions).

- Transport Layer Information.

- PDP Type Information (only for PS).

- Data Volume Reporting Indication (only for PS).

- DL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- UL GTP-PDU sequence number (only when GTP-PDU sequence number is available in cases of intersystem change from GPRS to UMTS or when establishing a RAB for an existing PDP context or in some further cases described in [21]).

- DL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

- UL N-PDU sequence number (only when N-PDU sequence number is available in case of intersystem change from GPRS to UMTS or in some further cases described in [21]).

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

- RAB ID (mandatory).

- NAS Synchronisation Indicator.

- RAB parameters.

- Transport Layer Information.

- User Plane Information.

The *Transport Layer Information* IE may be present at a RAB modification except in the case when the only other present IE, besides the *RAB ID* IE, is the *NAS Synchronisation Indicator* IE.

At a RAB modification, the *RAB parameter* IE and the *User Plane Information* IE shall be present in RAB ASSIGNMENT REQUEST message only when any previously set value is requested to be modified.

If, for a RAB requested to be modified, one (or more) of these IEs except *RAB ID* IE are not present in RAB ASSIGNMENT REQUEST message the RNC shall continue to use the value(s) currently in use for the not present IEs.

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

- RAB ID.

- Cause.

Upon reception of the RAB ASSIGNMENT REQUEST message UTRAN shall execute the requested RAB configuration. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT REQUEST message.

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

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

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

- The RNC shall consider the priority level of the requested RAB, when deciding on the resource allocation.

- If the requested RAB is allowed for queuing and the resource situation so requires, RNC may place the RAB in the establishment queue.

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

  1. The values of the last received *Pre-emption Vulnerability* IE and *Priority Level* IE shall prevail.

  2. If the *Pre-emption Capability* IE is set to "may trigger pre-emption", then this allocation request may trigger the pre-emption procedure.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- List of RABs successfully established or modified.

- List of RABs released.

- List of RABs queued.

- List of RABs failed to establish or modify.

- List of RABs failed to release.

The same RAB ID shall only be present once in the whole RAB ASSIGNMENT RESPONSE message.

For each RAB successfully established towards the PS domain, the RNC shall include the *Transport Layer Address* IE and the *Iu Transport Association* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully modified or released towards the PS domain, for which data volume reporting has been requested, the RNC shall include the *DL Data Volumes* IE in the RAB ASSIGNMENT RESPONSE message.

For each RAB successfully released towards the PS domain, the RNC shall include in the RAB ASSIGNMENT RESPONSE message, if available, the *DL GTP-PDU Sequence Number* IE and the *UL GTP-PDU Sequence Number* IE, if the release was initiated by UTRAN.

The RNC shall report in the RAB ASSIGNMENT RESPONSE message at least one RAB:

- setup/modified or

- released or

- queued or

- failed to setup/modify or

- failed to release.

If any alternative RAB parameter values have been used when establishing or modifying a RAB, these RAB parameter values shall be included in the RAB ASSIGNMENT RESPONSE message.

For the CS domain, when an ALCAP is used, UTRAN shall report the successful outcome of a specific RAB to establish or modify only after the Iu user plane at RNL level transport network control plane signalling, which is needed for RAB establishment or modification, has been executedis ready to be used in UL and DL. At a RAB establishment, the transport network control plane signalling required to set up the transport bearer shall use the *Transport Layer Address* IE and *Iu Transport Association* IE. At a RAB modification when *Transport Layer Address* (IE) and *Iu Transport Association* IEs are included, the RNC shall establish a new transport bearer. The transport network control plane signalling shall then use the included *Transport Layer Address* IE and *Iu Transport Association* IE. Then the switch over to this new transport bearer shall be done immediately after transport bearer establishment and initialisation of the user plane mode. If *Transport Layer Address* (IE) and *Iu Transport Association* IEs are not included, then the RNC may modify the already existing transport bearer.

For the PS domain or for the CS domain when an ALCAP is not used, for each RAB successfully modified towards the PS domain, if the RNC has changed the *Transport Layer Address* IE and/or the *Iu Transport Association* IE, it shall include the new value(s) in the RAB ASSIGNMENT RESPONSE message.

Before reporting the successful outcome of a specific RAB to establish or modify, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. 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 Assignment shall fail with the cause value "RNC unable to establish all RFCs".

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

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

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

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

- successfully established or modified;

- failed to establish or modify;

- failed due to expiry of the timer $T_{QUEUING}$.

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

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

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

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

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

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

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

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

After sending RAB ASSIGNMENT RESPONSE message containing RAB ID within the *RABs Released* IE, the RNC shall be prepared to receive new establishment request of a RAB identified by the same RAB ID

8.2.3 Unsuccessful Operation

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

8.2.4 Abnormal Conditions

For a RAB requested to be modified, if only the *RAB ID* IE, the *NAS Synchronisation Indicator* IE and the *Transport Layer Information* IE are included in the *First Setup or Modify Item* IE this RAB shall not be modified, and the corresponding *RAB ID* IE with *Cause* IE shall be included in the "RABs Failed To Setup Or Modify List" in the RAB ASSIGNMENT RESPONSE message.

If, for a RAB requested to be setup towards the PS domain, any of these following IEs:

- *PDP Type Information*.

- *Data Volume Reporting Indication.*

is not present, the RNC shall continue with the procedure.

Interactions with Relocation Preparation procedure:

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

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

   - for all queued RABs;

   - for RABs not already established or modified, and

   - for RABs not already released;

   with the cause "Relocation triggered".

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

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

   - for RABs already released but not yet reported to the CN.

3. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

4. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node(s).

5. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

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

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

1. The RNC shall terminate the RAB Assignment procedure indicating unsuccessful RAB configuration modification of that RAB with the cause "Directed retry".

2. The RNC shall report this outcome of the procedure in one RAB ASSIGNMENT RESPONSE message.

3. The RNC shall invoke relocation by sending the RELOCATION REQUIRED message to the active CN node, with the cause "Directed Retry".

4. The CN shall terminate the RAB Assignment procedure at reception of the RAB ASSIGNMENT RESPONSE message.

Next change

8.5 Iu Release

8.5.1 General

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

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

- Completion of transaction between UE and CN.

- UTRAN generated reasons, e.g. reception of IU RELEASE REQUEST message.

- Completion of successful relocation of SRNS.

- Cancellation of relocation after successful completion of the Relocation Resource Allocation procedure.
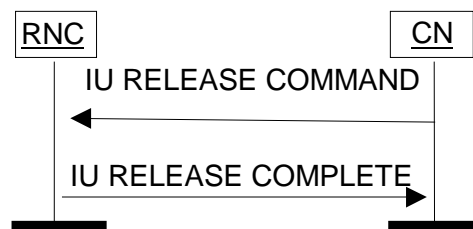
8.5.2 Successful Operation

Figure 2: Iu Release procedure. Successful operation.

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

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

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

When the RNC receives the IU RELEASE COMMAND message:

1. Clearing of the related UTRAN resources is initiated. However, the UTRAN shall not clear resources related to other Iu signalling connections the UE might have. The Iu transport bearers for RABs subject to data forwarding and other UTRAN resources used for the GTP-PDU forwarding process, are released by the RNC only when the timer $T_{DATAfwd}$ expires.

2. The RNC returns any assigned Iu user plane resources to idle i.e. neither uplink user data nor downlink user data can be transferred over the Iu interface anymore. Then the RNC sends an IU RELEASE COMPLETE message to the CN. (The RNC does not need to wait for the release of UTRAN radio resources or for the transport network layer signalling to be completed before returning the IU RELEASE COMPLETE message.) When an IU RELEASE COMPLETE message is sent, the procedure is terminated in the UTRAN.

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

If the release was initiated by UTRAN, for each RAB towards the PS domain, for which the *DL GTP-PDU Sequence Number* IE and/or the *UL GTP-PDU Sequence Number* IE are (is) available, the RNC shall include the available sequence number(s) in the *RABs Released Item* IE (within the *RAB Released List* IE) in the IU RELEASE COMPLETE message.

The *RAB Release Item* IE shall not be present if there is no sequence number to be reported for that RAB.

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

8.5.3   Abnormal Conditions

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

3GPP TSG-RAN WG3 Meeting #29   *R3-021540*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

CHANGE REQUEST

| ⌘ | **25.413** | **CR** | **463** | ⌘ | rev | **2** | ⌘ | Current version: | **3.9.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Correction to RNC Iu Coordination of relocation
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ April 2002
Category: ⌘	**F**	***Release:*** ⌘ R99

Use one of the following categories:	*Use one of the following releases:*
F *(essential correction)*	2 *(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	R96 *(Release 1996)*
B *(Addition of feature),*	R97 *(Release 1997)*
C *(Functional modification of feature)*	R98 *(Release 1998)*
D *(Editorial modification)*	R99 *(Release 1999)*
Detailed explanations of the above categories can	REL-4 *(Release 4)*
be found in 3GPP TR 21.900.	REL-5 *(Release 5)*

Reason for change:	⌘	Current text leads to the possibility to send the Source to Target container through only one domain in a 3g-3g relocation involving two domains whereas it is a contradiction since the container must be sent in the two Relocation Request messages.

Current text leads to the possibility that the Target to Source container sent via one domain may be different/complementary to the one sent via the other domain whereas the same container has to be sent via the two domains if this option is selected. |
| ***Summary of change:*** ⌘ | | Correction is made that the same container has to be sent back via the two domains. Correction is made to send twice the same Source to Target container IE when two domains are involved.
Erroneous sentence on the domain supporting the source to target container is suppressed.
A note is added for the error handling in the Abnormal Conditions sections.

Impact assessment towards the previous version of the specification (same release):
This CR has isolated impact with the previous version of the specification (same release) since the target RNC shall with this correction send twice the same container over the two domains when this option is selected and the source RNC shall always send twice the same container when there are two domains involved.

This CR has an impact under functional point of view for implementations not behaving like indicated in the CR.
The impact can be considered isolated because the change affects only the system functions relocation preparation and relocation resource allocation. |
| ***Consequences if*** | ⌘ | The Source to Target container could be sent via only one domain. The target to |

not approved:	Source container sent back via two domains could have differences even if not conflicting.

Clauses affected:	⌘	8.6.4,8.6.5, 8.7.4, 8.7.5		
Other specs affected:	⌘	**X** Other core specifications	⌘	TS25413 CR464 REL-4, TS25413 CR465 REL-5
		Test specifications		
		O&M Specifications		
Other comments:	⌘			

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.6.4   Abnormal Conditions

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

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

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

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* IE, the RNC behaviour is left implementation specific.

8.6.5   Co-ordination of Two Iu Signalling Connections

If the RNC has decided to initiate Relocation Preparation procedure for a UTRAN to UTRAN relocation, the RNC shall initiate simultaneously 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 in the RELOCATION REQUIRED message towards the two domains.

For intersystem handover to GSM, 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 RELOCATION COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been initiated.

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

8.7.4   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.

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5   Co-ordination of Two Iu Signalling Connections

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

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

-     The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

-     The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

-     If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, t~~T~~he target RNC shall ensure that ~~there is no conflicting information in~~ the same *Target RNC to Source RNC Transparent Container* IE is included in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domains ~~different Iu signalling connections~~ and related to the same relocation of SRNS.

-     ~~The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.~~

3GPP TSG-RAN WG3 Meeting #29 *R3-021541*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

CHANGE REQUEST

| ⌘ | **25.413** | CR | **464** | ⌘ | rev | **2** | ⌘ | Current version: | **4.4.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	Correction to RNC Iu Coordination of relocation
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ April 2002
Category: ⌘	**A**	***Release:*** ⌘ REL-4

Use one of the following categories:	*Use one of the following releases:*
F *(essential correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(Addition of feature),*	*R97 (Release 1997)*
C *(Functional modification of feature)*	*R98 (Release 1998)*
D *(Editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change:	⌘	Current text leads to the possibility to send the Source to Target container through only one domain in a 3g-3g relocation involving two domains whereas it is a contradiction since the container must be sent in the two Relocation Request messages. Current text leads to the possibility that the Target to Source container sent via one domain may be different/complementary to the one sent via the other domain whereas the same container has to be sent via the two domains if this option is selected.
Summary of change: ⌘		Correction is made that the same container has to be sent back via the two domains. Correction is made to send twice the same Source to Target container IE when two domains are involved. Erroneous sentence on the domain supporting the source to target container is suppressed. A note is added for the error handling in Abnormal Conditions sections. Impact assessment towards the previous version of the specification (same release): This CR has isolated impact with the previous version of the specification (same release) since the target RNC shall with this correction send twice the same container over the two domains when this option is selected and the source RNC shall always send twice the same container when there are two domains involved. This CR has an impact under functional point of view for implementations not behaving like indicated in the CR. The impact can be considered isolated because the change affects only the system functions relocation preparation and relocation resource allocation.
Consequences if not approved:	⌘	The Source to Target container could be sent via only one domain. The target to Source container sent back via two domains could have differences even if not

		conflicting.			

Clauses affected:	⌘	8.6.4,8.6.5, 8.7.4, 8.7.5			
Other specs	⌘	**X**	Other core specifications	⌘	TS25413 CR463 R99 TS25413 CR465 REL-5
affected:			Test specifications		
			O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.6.4   Abnormal Conditions

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

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

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

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* IE, the RNC
         behaviour is left implementation specific.

8.6.5   Co-ordination of Two Iu Signalling Connections

If the RNC has decided to initiate Relocation Preparation procedure for a UTRAN to UTRAN relocation, the RNC shall
initiate simultaneously 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 in the RELOCATION
REQUIRED message towards the two domains.

For intersystem handover to GSM, 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 RELOCATION
COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been
initiated.

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

8.7.4   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.

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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".

8.7.5   Co-ordination of Two Iu Signalling Connections

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

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

-     The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

-     The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

-     If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, t~~T~~he target RNC shall ensure that ~~there is no conflicting information in~~ the same *Target RNC to Source RNC Transparent Container* IE is included ~~in~~ in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domains ~~different Iu signalling connections~~ and related to the same relocation of SRNS.

-     ~~The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.~~

3GPP TSG-RAN WG3 Meeting #29   *R3-021542*
Gyeongju, Korea, 13th – May17ᵗʰ, 2002

<div style="text-align:right">*CR-Form-v3*</div>

CHANGE REQUEST

| ⌘ | **25.413** | CR | **465** | ⌘ | rev | **2** | ⌘ | Current version: | **5.0.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Correction to RNC Iu Coordination of relocation
Source:	⌘	R-WG3
Work item code: ⌘	TEI	*Date:* ⌘ April 2002
Category:	⌘ **A**	*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:
F *(essential correction)*	2 *(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	R96 *(Release 1996)*
B *(Addition of feature),*	R97 *(Release 1997)*
C *(Functional modification of feature)*	R98 *(Release 1998)*
D *(Editorial modification)*	R99 *(Release 1999)*
Detailed explanations of the above categories can	REL-4 *(Release 4)*
be found in 3GPP TR 21.900.	REL-5 *(Release 5)*

Reason for change:⌘[H1	Current text leads to the possibility to send the Source to Target container through only one domain in a 3g-3g relocation involving two domains whereas it is a contradiction since the container must be sent in the two Relocation Request messages. Current text leads to the possibility that the Target to Source container sent via one domain may be different/complementary to the one sent via the other domain whereas the same container has to be sent via the two domains if this option is selected.
Summary of change:⌘[H	Correction is made that the same container has to be sent back via the two domains. Correction is made to send twice the same Source to Target container IE when two domains are involved. Erroneous sentence on the domain supporting the source to target container is suppressed. A note is added for the error handling in the Abnormal Conditions sections. <u>Impact assessment towards the previous version of the specification (same release):</u> This CR has isolated impact with the previous version of the specification (same release) since the target RNC shall with this correction send twice the same container over the two domains when this option is selected and the source RNC shall always send twice the same container when there are two domains involved. This CR has an impact under functional point of view for implementations not behaving like indicated in the CR. The impact can be considered isolated because the change affects only the system functions relocation preparation and relocation resource allocation.
Consequences if *not approved:*	⌘	The Source to Target container could be sent via only one domain. The target to Source container sent back via two domains could have differences even if not conflicting.

Clauses affected:	⌘	8.6.4,8.6.5, 8.7.4,8.7.5			
Other specs	⌘	**X**	Other core specifications	⌘	TS25413 CR463 R99 TS25413 CR464 REL-4
affected:			Test specifications		
			O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.6.4   Abnormal Conditions

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

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

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

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* IE, the RNC behaviour is left implementation specific.

8.6.5   Co-ordination of Two Iu Signalling Connections

If the RNC has decided to initiate Relocation Preparation procedure for a UTRAN to UTRAN relocation, the RNC shall initiate simultaneously 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 in the RELOCATION REQUIRED message towards the two domains.

For intersystem handover to GSM, 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 RELOCATION COMMAND message from all Iu signalling connections for which the Relocation Preparation procedure has been initiated.

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

8.7.4   Abnormal Conditions

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

Interactions with Iu Release procedure:

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ 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 SRNS Relocation Resource Allocation procedure, the Target RNC may check whether the content of the two *Source RNC to Target RNC Transparent Container* IE is the same. In case the Target RNC receives two different *Source RNC to Target RNC Transparent Container* IE, 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.

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

-    The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

-    The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

-    If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, tThe target RNC shall ensure that there is no conflicting information in the same *Target RNC to Source RNC Transparent Container* IE is included in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domainsdifferent Iu signalling connections and related to the same relocation of SRNS.

-    The selection of signalling connection utilised for the *Target RNC to Source RNC Transparent Container* IE in RELOCATION REQUEST ACKNOWLEDGE message need not to be dependent on the signalling connection via which the *Source RNC to Target RNC Transparent Container* IE in RELOCATION REQUEST message was received.

| ⌘ | | 25.413 CR **467** | ⌘**rev** | **1** | ⌘ | Current version: | **3.9.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Clarification for the usage of the cause value
Source:	⌘	R-WG3
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-May
Category:	⌘ **F**	***Release:*** ⌘ R99

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

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

Reason for change:	⌘	The cause value, "Abstract Syntax Error (Ignore and Notify)", should not be set to the *Cause* IE. Please see R3-020971.

In case of abstract syntax error occurs in the IE which has the criticality of Ignore and Notify, the procedure shall be continue as if that error IE is not present and report in the response message(for class 1), or in Errir Indication (for class 2) that the error IE has been ignored.

However, in the above case, if the receiver further detect an error e.g. sementic error which should terminate the procedure, it is not clear what cause value(either Abstract Syntax Error (Ignore and Notify) or Sementic Error) shall be set in the failure messsage(for class 1) or Error ndication (for class 2).

Summary of change: ⌘	Rev.1	

Impact Analysis statement was corrected.

Rev.0

It was clarified that if an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.

Consequences if not approved:	⌘	If this CR is not approved, unsuitable cause value might be set to the *Cause* IE.

Impact Analysis:

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

			CR099 on TS25.419v4.4.0
			CR100 on TS25.419v5.0.0
			CR654 on TS25.423v3.9.0
			CR655 on TS25.423v4.4.0
			CR656 on TS25.423v5.0.0
			CR684 on TS25.433v3.9.0
			CR685 on TS25.433v4.4.0
			CR686 on TS25.433v5.0.0
			CR018 on TS25.453v5.3.0
affected:		☐ Test specifications	
		☐ O&M Specifications	
Other comments:	⌘		

How to create CRs using this form:

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

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

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

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

10.5   Exceptions

The error handling for all the cases described hereafter shall take precedence over any other error handling described in the other subclauses of clause 10.

-    If any type of error (Transfer Syntax Error, Abstract Syntax Error or Logical Error) is detected in the ERROR INDICATION message, it shall not trigger the Error Indication procedure in the receiving Node but local error handling.

-    In case a response message, failure message or Error Indication message needs to be returned, but the information necessary to determine the receiver of that message is missing, the procedure shall be considered as unsuccessfully terminated and local error handling shall be initiated.

-    If an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.

| ⌘ | 25.413 CR 468 | ⌘ rev | 1 | ⌘ | Current version: | 4.4.0 | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Clarification for the usage of the cause value	
Source: ⌘	R-WG3	
Work item code: ⌘	TEI	***Date:*** ⌘ 2002-May
Category: ⌘ **A**		***Release:*** ⌘ REL-4

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

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

Reason for change: ⌘	The cause value, "Abstract Syntax Error (Ignore and Notify)", should not be set to the *Cause* IE. Please see R3-020971.
	In case of abstract syntax error occurs in the IE which has the criticality of Ignore and Notify, the procedure shall be continue as if that error IE is not present and report in the response message(for class 1), or in Errir Indication (for class 2) that the error IE has been ignored.
	However, in the above case, if the receiver further detect an error e.g. semantic error which should terminate the procedure, it is not clear what cause value(either Abstract Syntax Error (Ignore and Notify) or Sementic Error) shall be set in the failure messsage(for class 1) or Error ndication (for class 2).
Summary of change: ⌘	Rev.1
	Impact Analysis statement was corrected.
	Rev.0
	It was clarified that if an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.
Consequences if not approved: ⌘	If this CR is not approved, unsuitable cause value might be set to the *Cause* IE.
	Impact Analysis:
	Impact assessment towards the previous version of the specification (same release):

		CR099 on TS25.419v4.4.0
		CR100 on TS25.419v5.0.0
		CR654 on TS25.423v3.9.0
		CR655 on TS25.423v4.4.0
		CR656 on TS25.423v5.0.0
		CR684 on TS25.433v3.9.0
		CR685 on TS25.433v4.4.0
		CR686 on TS25.433v5.0.0
		CR018 on TS25.453v5.3.0
affected:		Test specifications
		O&M Specifications
Other comments: ⌘		

How to create CRs using this form:

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

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

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

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

10.5 Exceptions

The error handling for all the cases described hereafter shall take precedence over any other error handling described in the other subclauses of clause 10.

- If any type of error (Transfer Syntax Error, Abstract Syntax Error or Logical Error) is detected in the ERROR INDICATION message, it shall not trigger the Error Indication procedure in the receiving Node but local error handling.

- In case a response message, failure message or Error Indication message needs to be returned, but the information necessary to determine the receiver of that message is missing, the procedure shall be considered as unsuccessfully terminated and local error handling shall be initiated.

- If an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.

⌘		25.413 CR 469	⌘ rev	1	⌘	Current version:	5.0.0	⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network **X**   Core Network **X**

Title:	⌘	Clarification for the usage of the cause value
Source:	⌘	R-WG3

Work item code: ⌘	TEI		***Date:*** ⌘	2002-May

Category: ⌘	**A**	***Release:*** ⌘	REL-5

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

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change:	⌘	The cause value, "Abstract Syntax Error (Ignore and Notify)", should not be set to the *Cause* IE. Please see R3-020971.
		In case of abstract syntax error occurs in the IE which has the criticality of Ignore and Notify, the procedure shall be continue as if that error IE is not present and report in the response message(for class 1), or in Errir Indication (for class 2) that the error IE has been ignored.
		However, in the above case, if the receiver further detect an error e.g. sementic error which should terminate the procedure, it is not clear what cause value(either Abstract Syntax Error (Ignore and Notify) or Sementic Error) shall be set in the failure messsage(for class 1) or Error ndication (for class 2).

Summary of change: ⌘		<u>Rev.1</u>
		Impact Analysis statement was corrected.
		<u>Rev.0</u>
		It was clarified that if an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.

Consequences if not approved:	⌘	If this CR is not approved, unsuitable cause value might be set to the *Cause* IE.
		<u>Impact Analysis:</u>
		Impact assessment towards the previous version of the specification (same release):

		CR099 on TS25.419v4.4.0 CR100 on TS25.419v5.0.0 CR654 on TS25.423v3.9.0 CR655 on TS25.423v4.4.0 CR656 on TS25.423v5.0.0 CR684 on TS25.433v3.9.0 CR685 on TS25.433v4.4.0 CR686 on TS25.433v5.0.0 CR018 on TS25.453v5.3.0
affected:		Test specifications O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

10.5 Exceptions

The error handling for all the cases described hereafter shall take precedence over any other error handling described in the other subclauses of clause 10.

- If any type of error (Transfer Syntax Error, Abstract Syntax Error or Logical Error) is detected in the ERROR INDICATION message, it shall not trigger the Error Indication procedure in the receiving Node but local error handling.

- In case a response message, failure message or Error Indication message needs to be returned, but the information necessary to determine the receiver of that message is missing, the procedure shall be considered as unsuccessfully terminated and local error handling shall be initiated.

- If an error that terminates a procedure occurs, the returned cause value shall reflect the error that caused the termination of the procedure even if one or more abstract syntax errors with criticality "ignore and notify" have earlier occurred within the same procedure.