

**Title:** [DRAFT] LS on future codecs with same SDU format as existing codecs

**Source:** TSG CN

**To:** SA4

**Cc:** CN4

**Contact Person:**

**Name:** Ludwig Hiebinger

**Tel. Number:** +49 89 636 75213

**E-mail Address:** Ludwig.Hiebinger@siemens.com

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**1. Overall Description:**

TSG CN#20 discussed CRs(Tdocs 211, Rel 4 CR's only) from CN4 on the subject of TrFO. These CRs mandate that no lu-UP framing protocol re-initialisation is sent on the lu interface and the Nb interface for a mid-call codec modification, if the SDU formats of the new and old codecs within the lu UP framing protocol are equal. Currently there is disagreement whether lu UP initialisation is required or not. The CRs were referred back to CN4 for further consideration.

Concerns were raised that the MGW is not able to distinguish between such SDUs belonging to the new and old codec (to ensure backwards compatibility in foreseeable future), if no lu UP re-initialisation is sent. Currently, the only existing codecs with the same SDU format are AMR and AMR2, where the contents of the SDUs do not differ and such a discrimination is not required. The concerns referred to future codecs. It was suggested that this problem could be avoided if SA4 is willing to agree that no future codecs with the same SDU formats(s), but different contents as existing codecs will be defined.

**2. Actions:**

**To SA4 group.**

**ACTION:** TSG CN asks SA4 to clarify that no future codecs with the same SDU format(s), but different contents as existing codecs will be defined and inform TSG CN#21 and CN4#20 about their decision. This will allow no lu UP initialisation to occur in these cases.

Could SA4 please give a reference to the right specification where this is reflected.

**3. Date of Next TSG-??? Meetings:**

TSG-CN WG4 Meeting #20      25th – 29th August 2003      Germany.

TSG-CN Meeting #21      17th – 19th September 2003      Germany

Attachment:

N4-030714

N4-030543

## CHANGE REQUEST

⌘ **23.153 CR 060** ⌘ rev **-** ⌘ Current version: **4.7.0** ⌘

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

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

<b>Title:</b>	⌘ Clarification of luUP Initialisation during codec modification		
<b>Source:</b>	⌘ LM Ericsson		
<b>Work item code:</b>	⌘ OoBTC	<b>Date:</b>	⌘ 6/5/2003
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)	<b>2</b> (GSM Phase 2)	
	<b>A</b> (corresponds to a correction in an earlier release)	<b>R96</b> (Release 1996)	
	<b>B</b> (addition of feature),	<b>R97</b> (Release 1997)	
	<b>C</b> (functional modification of feature)	<b>R98</b> (Release 1998)	
	<b>D</b> (editorial modification)	<b>R99</b> (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u> .	<b>Rel-4</b> (Release 4)	
		<b>Rel-5</b> (Release 5)	
		<b>Rel-6</b> (Release 6)	

<b>Reason for change:</b>	⌘ If the SDU requirements for a new codec are identical to the SDU requirements for the existing codec then at codec modification the MGW shall not re-initialise the User Plane through the core-network or expect to receive an luUP Init. Currently the specification is unclear in this respect.
<b>Summary of change:</b>	⌘ Clarification that the MGW only re-initialises the User Plane if the SDU formats change.
<b>Consequences if not approved:</b>	⌘ Interworking problems – one MGW may expect an luUP init when its peer does not send one, and vice versa.

<b>Clauses affected:</b>	⌘ 4.1										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ TS 29.232
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	⌘										

### How to create CRs using this form:

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

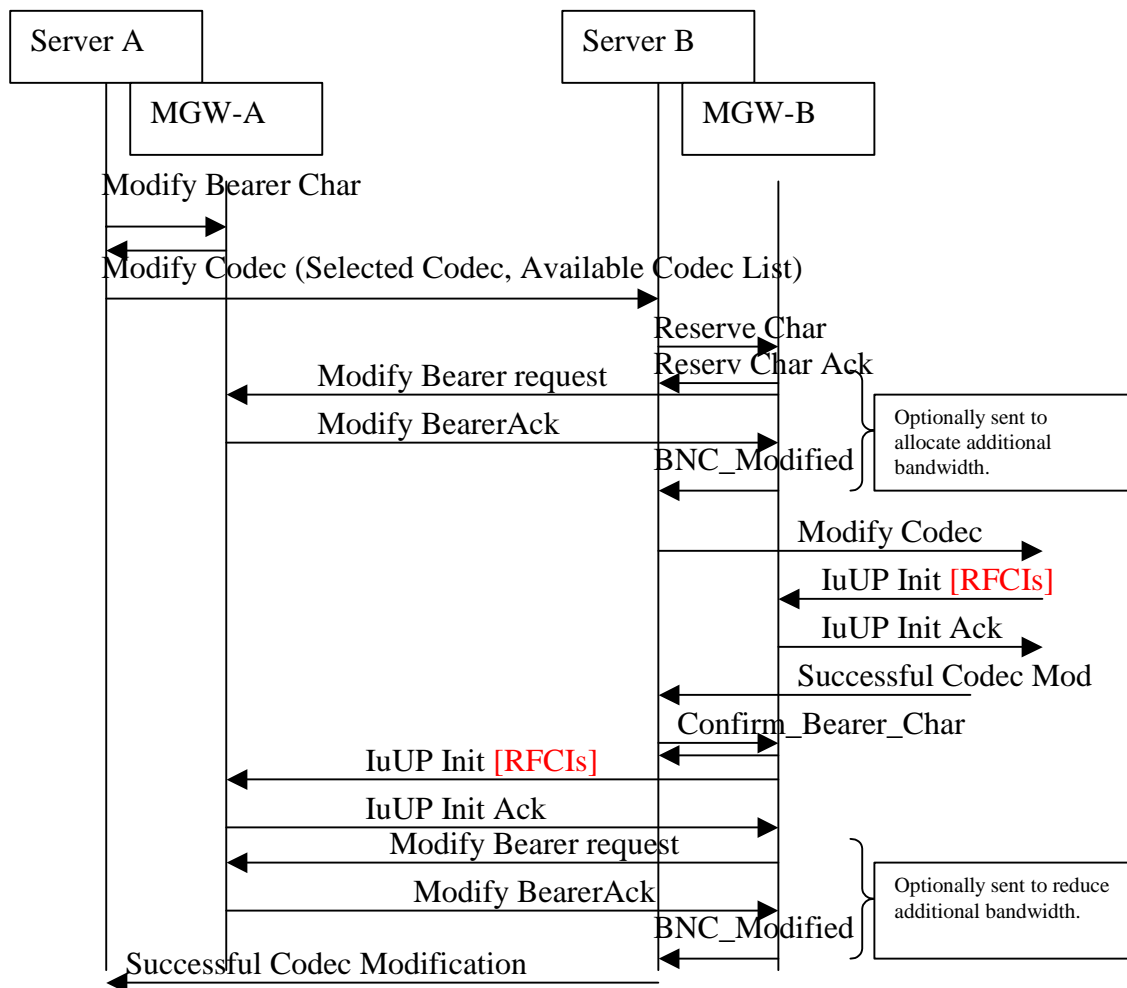
- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

### 5.8.4 Detailed Procedures For Iu Framing Protocol & Codec Modification

The IuFP must be initialised sequentially from one end to the other in order to store new RFCIs in each node to allow TrFO to resume. The IuFP shall be initialised in the backward direction with respect to the Codec Modification/Modify To Selected Codec message as shown in Figure 5.8.4/1.



**Figure 5.8.3.4/1: Successful Codec Modification including IuFP**

A MGW receiving a Modify Bearer Characteristics procedure shall be prepared to receive an incoming modify bearer procedure, this may be to increase the bandwidth prior to IuUP Initialisation or to reduce the bandwidth after the IuUP Initialisation. If As the new codec indicated in the Modify Bearer Characteristics procedure has different SDU format requirements from the codec that is currently used the MGW shall be prepared to receive an IuUP Initialisation for the new codec. If the SDU formats for both the old codec and the new codec are identical then no IuUP initialisation shall occur. The MGWs shall be prepared for the new codec type on receipt of the Modify Bearer Char procedure.

Each termination receiving a Reserve\_Char will initiate bearer level modification to the preceding node if needed - i.e. if the bandwidth needs to be increased to support the new IuUP. No IuUP initialisation occurs at this point in time. If the Codec Modification Request is terminated by a MGW the IuUP init through the core-network is triggered by the setting of the 3GUP package property “initialisation direction” to “OUT” in either the Reserve\_Char or the Confirm\_Char procedure; the MGW shall then start the IuUP Initialisation out from that Termination. If the node terminating the modification is an RNC then it will generate a new IuUP Initialisation toward its access MGW, each Termination shall have the initialisation direction set to “IN”. Each MGW shall in turn acknowledge the IuUP Init to the succeeding node (with respect to the modification request) and forward the RFCIs in an IuUP Initialisation to the preceding MGW (as for call set-up). After completing the Iu UP initialisation and receiving the “Confirm Characteristics” procedure, the MGW may decrease the bandwidth of the corresponding bearer performing the “Modify

Bearer” procedure (if needed) - no bearer bandwidth reduction shall be initiated while the UP is still initialised for the old codec. If the SDU formats for both the old codec and the new codec are identical then no IuUP initialisation shall occur. The MGWs shall be prepared for the new codec type on receipt of the Reserve Char procedure.

An example call sequence is shown in Figure 5.8.4/2.

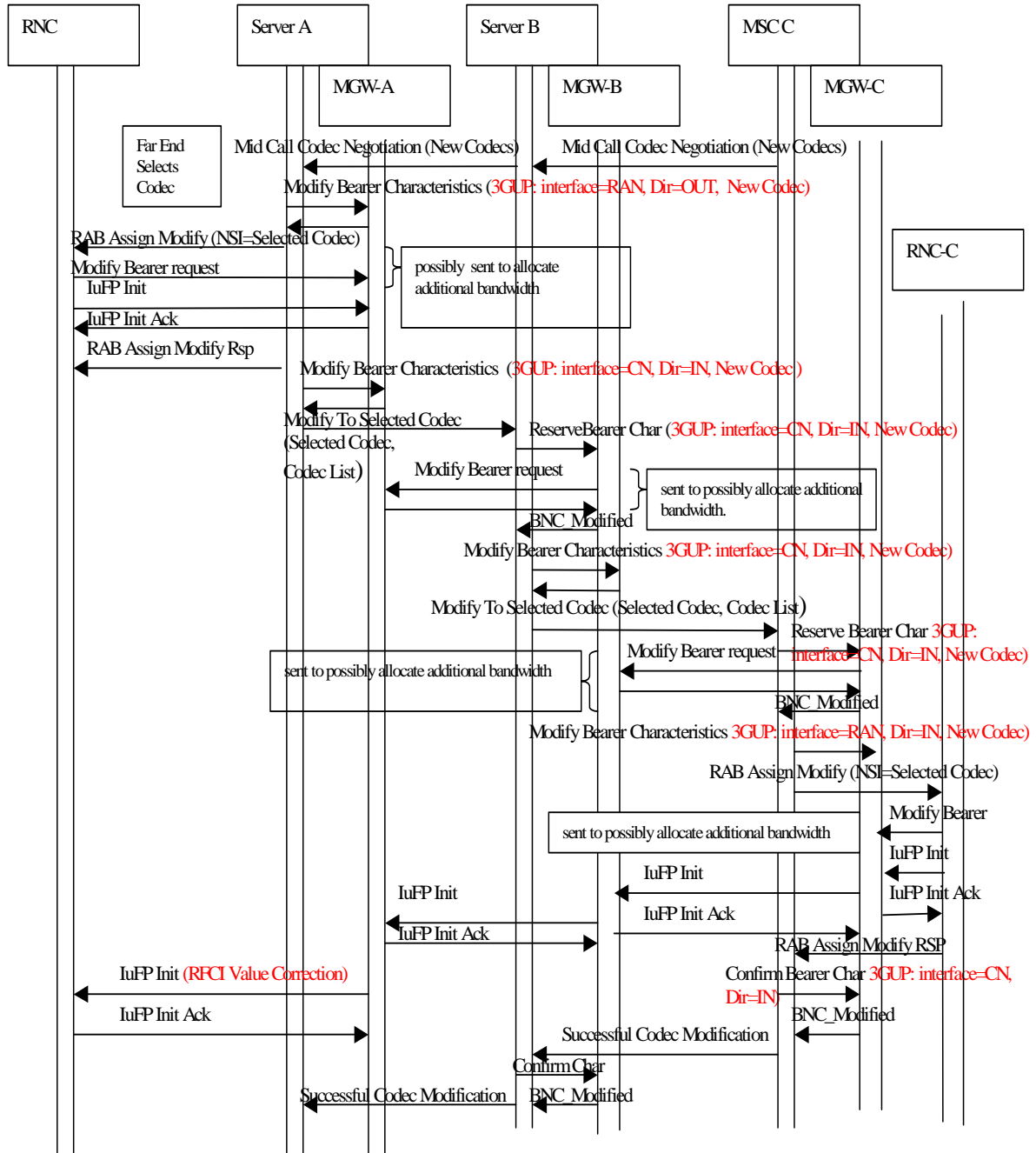


Figure 5.8.4/2: Mid Call Codec Negotiation Call Sequence

### 5.8.5 Unsuccessful Codec Modification

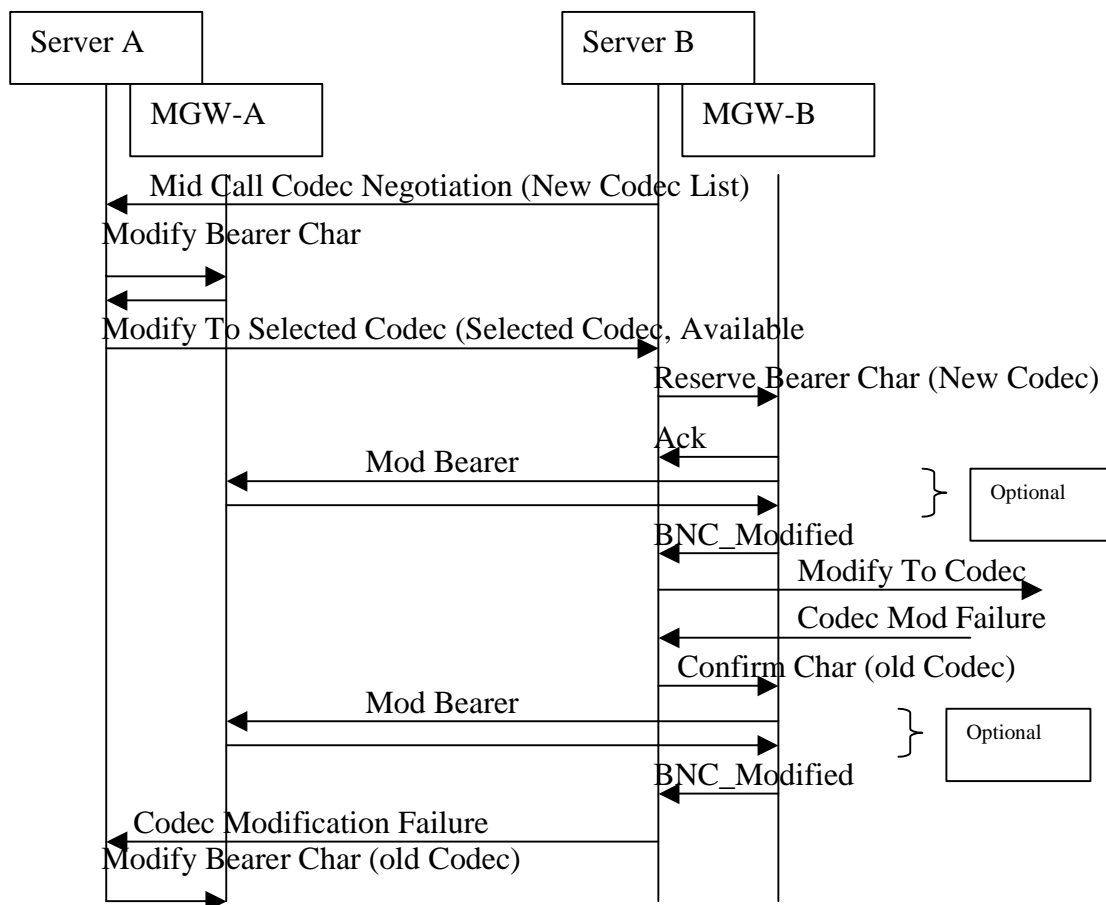
If the Codec Modification is unsuccessful at a certain node in the connection (due to the MGW rejecting a request to reserve the resources or a server rejecting the request to modify the codec) the Confirm\_Char message shall be sent to a termination that previously performed a successful Reserve\_Char Procedure to change the bearer back to its original bandwidth (if needed) and free up any reserved resources. However as the IuUP has not been modified, the Confirm\_Char shall not trigger an IuFP re-initialisation. The basic sequence is shown in Figure 5.8.5/1 and a detailed

call flow is described in Figure 5.8.5/2. A server that performed a Modify Bearer Characteristics procedure to a termination with the new codec shall perform a subsequent Modify Bearer Characteristics procedure to that termination with the old codec in the failure case. As no IuFP initialisation occurs in the unsuccessful case the IuFP currently initialised will then match the old codec restored by the subsequent Modify Bearer Char; the MGW then knows that it can return to TrFO. If the SDU formats for both the old codec and the new codec are identical then no IuUP initialisation would be needed. The MGWs can return to TrFO when the Old Codec is signalled in the subsequent Confirm Char or Modify Bearer Char procedure.

The Codec Modification Failure message shall not be returned to a preceding node until notification of the bearer level modification (BNC\_Modified).

**RAB Assigment Modification Failure**

If the reason for failed codec modification is due to an unsuccessful RAB Modification Request then the MSC shall assume that the old RAB is resumed and thus shall restore the old codec.



**Figure 5.8.5/1: Unsuccessful Codec Modification**

**IuUP Initialisation Unsuccessful**

If the IuUP initialisation fails (this must be due to some protocol error or transmission error because the resources have already been successfully reserved) then the UP protocol is cleared by the peers (see TS 25.415) and therefore the MGW shall notify the Server with a Bearer\_Released notification, the call shall be cleared (normal MGW initiated call clearing applies – see TS 23.205 clause 7.4 [8]).

**Title:** LS on lu UP Initialisation during RAB modification

**Release:** Rel-4

**Source:** RAN3

**To:** CN4

**Cc:** -

**Contact Person:**

**Name:** Martin Israelsson

**Tel. Number:** +46 8 764 1199

**E-mail Address:** [martin.israelsson@era.ericsson.se](mailto:martin.israelsson@era.ericsson.se)

**Attachments:** R3-030880 [RAN3 approved CR575r2 on 25.413 Rel-4].

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**1. Overall Description:**

RAN3 would like to inform CN4 about a clarification of the UTRAN behaviour during RAB modifications that was agreed during RAN3 meeting #36 in Paris. The criterias for re-initialisation of the user plane has been defined in order to provide a predictable UTRAN behaviour.

The following RNC behaviour can be observed after taking the CR into account:

- Re-initialisation of the user plane will only occur during a RAB modification if the SDU parameters are changed or if RAB parameters are included together with NSI.
- Re-initialisation of the user plane will not occur during a RAB modification if the RAB parameters are not included.

For further details see the attached CR.

**2. Actions:**

**To CN4 group.**

**ACTION:** RAN3 would like to ask CN4 to take into account the clarified UTRAN behaviour.

**3. Date of Next TSG-RAN3 Meetings:**

TSG-RAN3 #37                      25th – 29th August 2003                      Budapest, Hungary.

TSG-RAN3 #38                      6th – 10th October 2003                      Sophia-Antipolis, France

## CHANGE REQUEST

⌘ **25.413 CR 576** ⌘ rev **2** ⌘ Current version: **5.4.0** ⌘

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

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

<b>Title:</b>	⌘ lu UP Initialisation during RAB modification		
<b>Source:</b>	⌘ Siemens, Ericsson		
<b>Work item code:</b>	⌘ TEI4	<b>Date:</b>	⌘ 22/05/2003
<b>Category:</b>	⌘ <b>A</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		2 (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		R96 (Release 1996)
	<b>B</b> (addition of feature),		R97 (Release 1997)
	<b>C</b> (functional modification of feature)		R98 (Release 1998)
	<b>D</b> (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

<b>Reason for change:</b>	⌘ Currently, the behaviour of the RNC with respect to an lu UP re-initialisation during a RAB modification, where SDU sizes do not change, is not fully specified.  CR205 was introduced as a result of LS R3-001634 from CN1 but the CR did not fully clarify that the RNC shall not re-initialise the luUP if no RAB parameters are included in the RANAP RAB Assignment modification.
<b>Summary of change:</b>	⌘ The RNC shall only send an lu UP Initialisation at RAB modification if the SDU parameters are changed or if RAB parameters are included together with NSI.
<b>Consequences if not approved:</b>	⌘ Calls may break down as result of a RAB modification where SDU sizes do not change.  <u>Impact assessment towards the previous version of the specification (same release):</u>  This CR has isolated impact towards the previous version of the specification (same release).  This CR has an impact under functional point of view.  The impact can be considered isolated because it only affects the lu UP initialisation functionality in case of RAB modification.

**Clauses affected:** ⌘ 8.2.2



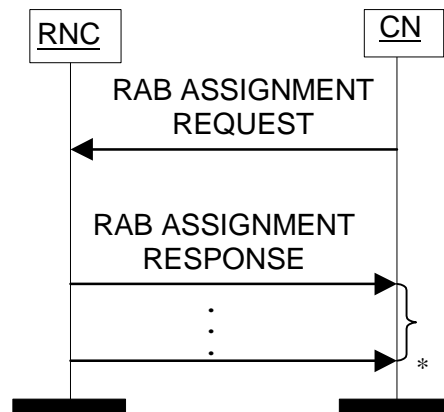
<b>Other specs affected:</b>		<b>Y</b>	<b>N</b>	Other core specifications	⌘ CR575 25.413 4.8.0	
	⌘	<b>X</b>				Test specifications
			<b>X</b>			O&M Specifications
<b>Other comments:</b>	⌘					

## 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 that does not include transfer of *NAS Synchronisation Indicator* IE, the *RAB Parameters* 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".

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

If the *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 within the *Assigned RAB Parameter Values* IE.

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 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 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, if necessary, as requested by the CN in the *User Plane Mode IE*.

Re-initialisation of the user plane shall not be performed if:

- the *RAB Parameters IE* is not included, for example during transfer of *NAS Synchronisation Indicator IE*;
- the *RAB Parameters IE* is included but *SDU Format Information Parameter IE* is not changed for the existing RAB and *NAS Synchronisation Indicator IE* is not included.

Re-initialisation of the user plane shall be performed if the *RAB Parameters IE* and *NAS Synchronisation Indicator IE* are included.

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  $T_{QUEUEING}$ . This timer specifies the maximum time for queuing of the request of establishment or modification. The same timer  $T_{QUEUEING}$  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  $T_{QUEUEING}$ .

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  $T_{QUEUEING}$  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  $T_{QUEUEING}$  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".

If the UTRAN failed to modify a RAB it shall keep the RAB as it was configured prior to the modification request.

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.

### 8.2.2.1 Successful Operation for GERAN Iu-mode

For GERAN Iu-mode the following shall apply in addition for the successful operation of the RAB Assignment procedure:

- In case of GERAN Iu-mode, for a RAB requested to be setup or modified from the the CS domain, the RAB ASSIGNMENT REQUEST message may contain the *GERAN BSC Container* IE in order to provide GERAN specific information to GERAN (see [27]).
- In case of GERAN Iu-mode (only for CS), if the BSC cannot provide an appropriate RAB corresponding to the content of the *GERAN BSC Container* IE (if received), the BSC shall report unsuccessful RAB establishment/modification indicating the cause value "GERAN Iu-mode Failure" and the *GERAN Classmark* IE in the *GERAN Iu mode specific RABs Failed To Setup Or Modify List* IE within the RAB ASSIGNMENT RESPONSE message.

### 8.2.3 Unsuccessful Operation

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

### 8.2.4 Abnormal Conditions

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.