TSG-RAN Meeting #12
Stockholm, Sweden, 12 - 15 June 2001

TSGRP#12(01) 0376

Title: **Agreed CRs to TS 25.415**

Source: **TSG-RAN WG3**

Agenda item: **8.3.3/8.3.4**

Tdoc_Num	Specification	CR_Num	Revision_Num	CR_Subject	CR_Category	WG_Status	Cur_Ver_Num	New_Ver_Num	Workitem
R3-011356	25.415	052	2	In-sequence delivery requirement	F	agreed	3.6.0	3.7.0	TEI
R3-011357	25.415	061		In-sequence delivery requirement	A	agreed	4.0.0	4.1.0	TEI
R3-011787	25.415	065	2	UP initialisation procedure	F	agreed	3.6.0	3.7.0	TEI
R3-011788	25.415	066	2	UP initialisation procedure	A	agreed	4.0.0	4.1.0	TEI

3GPP TSG-RAN3 Meeting #20 **R3-011356**
Beijing, China, April 2nd – April 6th, 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.415** **CR** **052** ⌘ rev **2** ⌘ Current version: **3.6.0** ⌘

*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:	⌘	In-sequence delivery requirement
Source:	⌘	R-WG3
Work item code:	⌘	TEI
Date:	⌘	2001-04-26
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:	⌘	Currently there is no text in 25.415 saying if transport layers should be able to handle in-sequence delivery or not. For R99 it is however essential that in-sequence delivery is performed for certain services (e.g. for CS data services and AMR speech). There is also a RAB parameter 'Delivery order' that tells if the RAB shall support in-sequence delivery. For R99 the Transport layers (AAL2 and GTP) handles the in-sequence delivery for these services. The requirement that transport layers should be able to provide in-sequence delivery is however needed. The requirement is especially important when new transport layers are introduced. r1: The requirement aligned with text in 25.413 and 23.107 for RAB parameter 'Delivery Order'. Editorial change: Added text 'in Support mode' in 6.3 to make the text form in 5.3 and 6.3 consistent.
Summary of change:	⌘	State the requirement of in-sequence delivery on transport layer when requested by the RAB parameters for 'transparent mode' and 'support mode for predefined SDU sizes'.
Consequences if not approved:	⌘	A requirement on transport layer is missing. If a new transport layer is introduced it is not clear that it should be able to support in-sequence delivery, and then some services (e.g CS data) could fail to work properly. Additional information: The proposed change is backwards compatible, since the specified transport layers in R99 (AAL2 and GTP) already fulfil this requirement.

Clauses affected:	⌘	5.3, 6.3
Other specs	⌘	**X** Other core specifications ⌘ 25.415 CR061 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.

5.3 Services Expected from the UP Data Transport layer

The Iu UP protocol layer in transparent mode expects the following services from the Transport Network Layer:

- Transfer of user data.
- Delivery of SDUs in sequence when requested by the RAB parameter 'Delivery Order' [3].

6.3 Services Expected from the UP Data Transport layer

The Iu UP protocol layer in Support Mode expects the following services from the Transport Network Layer:

- Transfer of user data.
- Delivery of SDUs in sequence when requested by the RAB parameter 'Delivery Order' [3].

3GPP TSG-RAN3 Meeting #20 **R3-011357**
Beijing, China, April 2nd – April 6th, 2001

CR-Form-v3

CHANGE REQUEST

⌘ **25.415** **CR** **061** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	In-sequence delivery requirement
Source:	⌘	R-WG3
Work item code:	⌘	TEI
Date:	⌘	2001-04-26
Category:	⌘	**A**
Release:	⌘	REL-4

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)*
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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: ⌘ Currently there is no text in 25.415 saying if transport layers should be able to handle in-sequence delivery or not. For certain services (e.g. for CS data services and AMR speech) it is however essential that in-sequence delivery is performed. There is also a RAB parameter 'Delivery order' that tells if the RAB shall support in-sequence delivery. For REL-4 the Transport layers (AAL2 and GTP) handles the in-sequence delivery for these services.
The requirement that transport layers should be able to provide in-sequence delivery is however needed. The requirement is especially important when new transport layers are introduced.

The requirement aligned with text in 25.413 and 23.107 for RAB parameter 'Delivery Order'. Editorial change: Added text 'in Support mode' in 6.3 to make the text form in 5.3 and 6.3 consistent.

Summary of change: ⌘ State the requirement of in-sequence delivery on transport layer when requested by the RAB parameters for 'transparent mode' and 'support mode for predefined SDU sizes'.

Consequences if not approved: ⌘ A requirement on transport layer is missing. If a new transport layer is introduced it is not clear that it should be able to support in-sequence delivery, and then some services (e.g CS data) could fail to work properly.

Additional information:
The proposed change is backwards compatible, since the specified transport layers in REL-4 (AAL2 and GTP) already fulfil this requirement.

Clauses affected: ⌘ 5.3, 6.3

Other specs ⌘ **X** Other core specifications ⌘ 25.415 CR052 R99

affected:	☐ Test specifications ☐ O&M Specifications	
Other comments: ⌘		

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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.

5.3 Services Expected from the UP Data Transport layer

The Iu UP protocol layer in transparent mode expects the following services from the Transport Network Layer:

- Transfer of user data.
- Delivery of SDUs in sequence when requested by the RAB parameter 'Delivery Order' [3].

6.3 Services Expected from the UP Data Transport layer

The Iu UP protocol layer in Support Mode expects the following services from the Transport Network Layer:

- Transfer of user data.
- Delivery of SDUs in sequence when requested by the RAB parameter 'Delivery Order' [3].

3GPP TSG-RAN WG3 Meeting #21
Busan, Korea, 21st May – 25th May 2001

Tdoc R3-011787
revised CR of R3-011748

CR-Form-v3

CHANGE REQUEST

⌘ **25.415 CR 065** ⌘ rev **2** ⌘ Current version: **3.6.0** ⌘

*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:	⌘	UP initialisation procedure
Source:	⌘	R-WG3
Work item code:	⌘	TEI
Date:	⌘	15-05-2001
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:	⌘	Clarification on the handling of chained initialisation frames.
Summary of change:	⌘	Use of frame number, timer, non-chained initialisation frames and unsuccessful outcome clarified.
Consequences if not approved:	⌘	There still might be some interoperability issue due to misinterpretations. This CR is backwards compatible.

Clauses affected:	⌘	6.5.2		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.415 CR066 REL-4
Other comments:	⌘			

6.5.2 Initialisation procedure

6.5.2.1 Successful operation

This procedure is mandatory for RABs using the support mode for predefined SDU size. The purpose of the initialisation procedure is to configure both termination points of the Iu UP with the RFCIs and associated RAB Sub

Flows SDU sizes necessary during the transfer of user data phase. Additional parameters may also be passed, such as the Inter PDU Timing Interval (IPTI) information.

The initialisation procedure is always controlled by the entity in charge of establishing the Radio Network Layer User Plane i.e. SRNC.

The initialisation procedure is invoked whenever indicated by the Iu UP Procedure Control function e.g. as a result of a relocation of SRNS or at RAB establishment over Iu. The initialisation procedure shall not be re-invoked for the RAB without a RAB modification requested via RANAP [3].

When this procedure is invoked all other Iu UP procedures are suspended until termination of the initialisation procedure.

The RNC indicates the Iu UP Mode version it uses for the initialisation as well as the Iu UP Mode versions it supports for the related RAB. The sender should use the lowest version for the initialisation that has enough information to initialise the highest proposed protocol version.

The SRNC allocates a RAB sub-Flow Combination indicator (RFCI) to each RAB sub-Flow Combination it initialises. The association of indicators to RAB Flow Combinations is valid in the Iu UP until a new initialisation procedure is performed or the connection is terminated.

The procedure control function may also generate additional Iu UP protocol parameters necessary for the RAB service to operate properly over Iu.

To each RAB sub-Flow combination indicator is associated the size of each RAB sub-Flow SDU of that combination. The list of RAB sub-Flow Combination Indicators and their respective SDU sizes constitutes the RAB sub-Flow Combination set passed over the Iu UP in the initialisation frame i.e. into an appropriate Iu UP PDU Type.

The first RAB sub-Flow Combination proposed in the list of RAB sub-Flow Combination indicates the initial RAB sub-Flow Combination i.e. the first RAB sub-Flow Combination to be used when starting the communication phase i.e. the transfer of user data procedure.

The complete set of information is framed by the Iu UP Frame Handler function and transferred in an Iu UP initialisation frame. If needed, the initialisation frame CRC is calculated and set accordingly in the respective frame field.

A supervision timer T_{INIT} is started after sending the Iu UP initialisation frame. This timer supervises the reception of the initialisation acknowledgement frame.

Upon reception of a frame indicating that an initialisation control procedure is active in the peer Iu UP entity, the Iu UP protocol layer forwards to the upper layers the RAB sub-Flow Combination set to be used by the Control procedure function. It also stores the RAB sub-Flow Combination set in order to control during the transfer of user data, that the Iu UP payload is correctly formatted (e.g. RFCI matches the expected Iu UP frame payload total length). The CN entity receiving the initialisation message shall choose a version that it supports and for which it has enough initialisation information.

If the initialisation frame is correctly formatted and treated by the receiving Iu UP protocol layer, this latter sends an initialisation acknowledgement frame using the version of the Iu UP Mode that is chosen.

Upon reception of an initialisation acknowledgement frame, the Iu UP protocol layer in the SRNC stops the supervision timer T_{INIT}.

If the initialisation procedure requires that several frames are to be sent, each frame shall be acknowledged individually (i.e. any ~~.~~

~~If several initialisation frames are used for the initialisation procedure, the next frame~~ frame to be sent shall wait for the acknowledgement of the previous sent frame to be received before being sent~~ding~~). The supervision timer shall be~~is~~ used individually for each frame being sent~~in a chain~~.

The successful operation of the initialisation procedure may require that one or several chained frames are positively acknowledged. The number of initialisation frames in such a chain ~~(with different frame numbers)~~ shall not exceed 4. Each chained frame shall be positively acknowledged before the one with the next frame number can be sent.

The frame number of an initialisation frame shall ~~is~~ always be set to zero when the chain has only one frame. ~~for the first~~

~~initialisation frame.~~ When several ~~chained~~ initialisation frames are used in a chain, the frame number shall be set to zero for the first one and incremented by one in the sending direction for each new frame in the chain. The positive acknowledgement or negative acknowledgement shall carry~~ies~~ the frame number of the frame being acknowledged.

Upon reception of an initialisation negative acknowledgement frame, an erroneous acknowledgement or at timer T_{INIT} expiry, the Iu UP protocol layer in the SRNC shall reset and restart the T_{INIT} supervision timer and repeat one~~an~~ initialisation frame with the same frame number. The repetition shall~~can~~ be performed up to N_{INIT} times, N_{INIT} being chosen by the operator (default $N_{INIT} = 3$). The N_{INIT} (maximum number of allowed repetitions) is the aggregate count for each frame in the chain and is restart each time a frame is positively acknowledged.

Consequently, when in the communication phase (as indicated by internal functions in the Radio Network layer), the frame transmission starts in downlink in the initial RFCI.

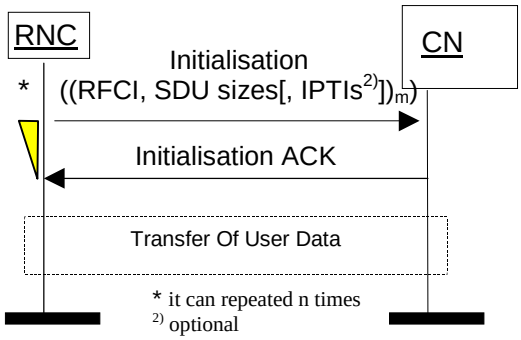

Figure 9: Successful Initialisation of Iu UP for m RFCIs

6.5.2.2 Unsuccessful operation

If the initialisation frame is incorrectly formatted and cannot be correctly treated by the receiving Iu UP protocol layer, this latter sends an initialisation negative acknowledgement frame.

If the receiver does not support the Iu UP Mode version for the initialisation procedure, it shall send a negative acknowledgement using the highest version it supports among the versions proposed by the sender. If none of the proposed versions are supported, the receiver shall respond with a negative acknowledgement using the highest version it supports.

A~~If a~~fter N_{INIT} successive negative acknowledgment~~repetition~~, erroneous acknowledgment or timer T_{INIT} expiry for initialisation frames having the same frame number, the initialisation procedure is unsuccessfully terminated. ~~(because of N_{INIT} negative acknowledgement or timer T_{INIT} expires),~~ T~~t~~he Iu UP protocol layers (sending and receiving) take appropriate local actions.

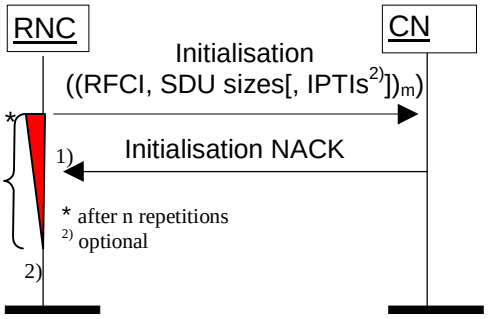

Figure 10: Unsuccessful initialisation of Iu UP: 1) N_{INIT} negative acknowledgement or 2) N_{INIT} timer expires

3GPP TSG-RAN WG3 Meeting #21
Busan, Korea, 21st May – 25th May 2001

Tdoc R3-011788
revised CR of R3-011749

CR-Form-v3

CHANGE REQUEST

⌘ **25.415** **CR** **066** ⌘ rev **2** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	UP initialisation procedure
Source:	⌘	R-WG3
Work item code:	⌘	TEI
Date:	⌘	15-05-2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
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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:	⌘	Clarification on the handling of chained initialisation frames.
Summary of change:	⌘	Use of frame number, timer, non-chained initialisation frames and unsuccessful outcome clarified.
Consequences if not approved:	⌘	There still might be some interoperability issues due to misinterpretations. This CR is backwards compatible.

Clauses affected:	⌘	6.5.2		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.415 CR065 R99
Other comments:	⌘			

6.5.2 Initialisation procedure

6.5.2.1 Successful operation

This procedure is mandatory for RABs using the support mode for predefined SDU size. The purpose of the initialisation procedure is to configure both termination points of the Iu UP with the RFCIs and associated RAB Sub Flows SDU sizes necessary during the transfer of user data phase. Additional parameters may also be passed, such as the Inter PDU Timing Interval (IPTI) information.

The initialisation procedure may be controlled at both end of the Iu access point, i.e. the CN and UTRAN.

The initialisation procedure is invoked whenever indicated by the Iu UP Procedure Control function e.g. as a result of a relocation of SRNS or at RAB establishment over Iu or if the CN decides to resolve RFCI mismatch in case of TrFO (see [13]). The initialisation procedure shall not be re-invoked by the SRNC for the RAB without a RAB modification requested via RANAP [3].

When this procedure is invoked all other Iu UP procedures are suspended until termination of the initialisation procedure.

The Iu UP protocol entity invoking this procedure indicates the Iu UP Mode version it uses for the initialisation as well as the Iu UP Mode versions it supports for the related RAB. The sender should use the lowest version for the initialisation that has enough information to initialise the highest proposed protocol version.

The invoking entity allocates a RAB sub-Flow Combination indicator (RFCI) to each RAB sub-Flow Combination it initialises. The association of indicators to RAB Flow Combinations is valid in the Iu UP until a new initialisation procedure is performed or the connection is terminated.

The procedure control function may also generate additional Iu UP protocol parameters necessary for the RAB service to operate properly over Iu.

To each RAB sub-Flow combination indicator is associated the size of each RAB sub-Flow SDU of that combination. The list of RAB sub-Flow Combination Indicators and their respective SDU sizes constitutes the RAB sub-Flow Combination set passed over the Iu UP in the initialisation frame i.e. into an appropriate Iu UP PDU Type.

The first RAB sub-Flow Combination proposed in the list of RAB sub-Flow Combination indicates the initial RAB sub-Flow Combination i.e. the first RAB sub-Flow Combination to be used when starting the communication phase i.e. the transfer of user data procedure.

The complete set of information is framed by the Iu UP Frame Handler function and transferred in an Iu UP initialisation frame. If needed, the initialisation frame CRC is calculated and set accordingly in the respective frame field.

A supervision timer T_{INIT} is started after sending the Iu UP initialisation frame. This timer supervises the reception of the initialisation acknowledgement frame.

Upon reception of a frame indicating that an initialisation control procedure is active in the peer Iu UP entity, the Iu UP protocol layer forwards the whole protocol information contained in the initialisation frame to the upper layers. It also stores the RAB sub-Flow Combination set in order to control during the transfer of user data, that the Iu UP payload is correctly formatted (e.g. RFCI matches the expected Iu UP frame payload total length). The peer Iu UP entity receiving the initialisation message shall choose a version that it supports and for which it has enough initialisation information.

If the initialisation frame is correctly formatted and treated by the receiving Iu UP protocol layer, this latter sends an initialisation acknowledgement frame using the version of the Iu UP Mode that is chosen.

Upon reception of an initialisation acknowledgement frame, the Iu UP protocol layer in the SRNC stops the supervision timer T_{INIT}.

If the initialisation procedure requires that several frames are to be sent, each frame shall be acknowledged individually (i.e. any ~~.~~

~~If several initialisation frames are used for the initialisation procedure, the next~~ frame to be sent shall wait for the

acknowledgement of the previous sent frame to be received before being sent).~~sending.~~ The supervision timer shall be~~is~~ used individually for each frame being sent.~~in a chain. The number of initialisation frames in a chain (with different frame numbers) shall not exceed 4.~~

The successful operation of the initialisation procedure may require that one or several chained frames are positively acknowledged. The number of initialisation frames in such a chain shall not exceed 4. Each chained frame shall be positively acknowledged before the one with the next frame number can be sent.

The frame number of an initialisation frame ~~is~~shall -always be set to zero when the chain has only one frame. ~~for the first initialisation frame.~~ When several ~~chained~~ initialisation frames are used in a chain, the frame number shall be set to zero for the first one and incremented by one in the sending direction for each new frame in the chain. The positive acknowledgement or negative acknowledgement shall carry~~ies~~ the frame number of the frame being acknowledged.

Upon reception of an initialisation negative acknowledgement frame, an erroneous acknowledgement or at timer T_{INIT} expiry, the Iu UP protocol entity controlling the initialisation procedure shall reset and restart the T_{INIT} supervision timer and repeat one~~an~~ initialisation frame with the same frame number. The repetition shall ~~can~~ be performed up to N_{INIT} times, N_{INIT} being chosen by the operator (default $N_{INIT} = 3$). The N_{INIT} (maximum number of allowed repetition) is the aggregate count for each frame in the chain and is restart each time a frame is positively acknowledged.

Consequently, when in the communication phase (as indicated by internal functions in the Radio Network layer), the frame transmission starts in downlink in the initial RFCI.

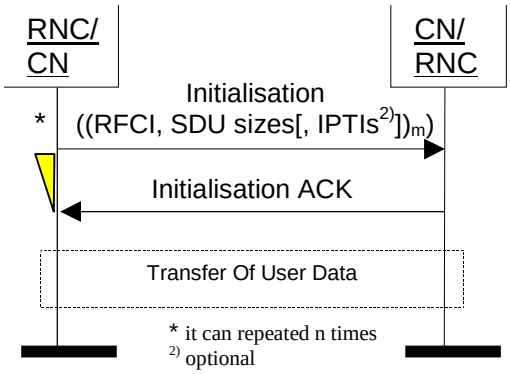

Figure 9: Successful Initialisation of Iu UP for m RFCIs

6.5.2.2 Unsuccessful operation

If the initialisation frame is incorrectly formatted and cannot be correctly treated by the receiving Iu UP protocol layer, this latter sends an initialisation negative acknowledgement frame.

If the receiver does not support the Iu UP Mode version for the initialisation procedure, it shall send a negative acknowledgement using the highest version it supports among the versions proposed by the sender. If none of the proposed versions are supported, the receiver shall respond with a negative acknowledgement using the highest version it supports.

A~~If a~~fter N_{INIT} successive negative acknowledgment, erroneous acknowledgment or T_{INIT} expiry for initialisation frames having the same frame number~~repetitions of initialisation frames (because of NACK, erroneous ACK and/or timer T_{INIT} expiry) for one initialisation procedure~~, the initialisation procedure is unsuccessfully terminated and the Iu UP protocol layers in RNC take appropriate local actions.

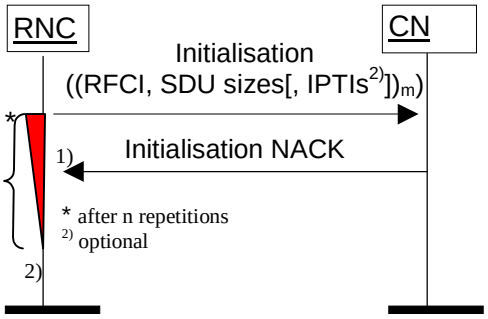

Figure 10: Unsuccessful initialisation of Iu UP: 1) N_{INIT} negative acknowledgement or 2) N_{INIT} timer expires