3GPP TSG-RAN WG2 #31 ***R2-022209***
Stockholm, Sweden, 19th-23th August, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.301 CR 067** ⌘**rev 1** ⌘ Current version: **3.a.0** ⌘

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

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

Title:	⌘	Clarification on RLC connection
Source:	⌘	Nortel Networks
Work item code:	⌘	TEI
Date:	⌘	18/08/2002
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)
Rel-6 (Release 6)

Reason for change: ⌘ At the RAN2#30 meeting, it was agreed that one Radio Bearer can use two UM or TM RLC entities to support ~~bi-directional~~ real-time communication. Therefore, the sentence in 5.3.2.1, 'There is a single RLC connection per Radio Bearer', is misleading or even incorrect. This sentence needs to be clarified.

Summary of change: ⌘

~~1.It is clarified that an RLC connection is composed of two peer RLC entities.~~
~~2.It is clarified that for bi-directional RB, one AM RLC connection or two UM or TM RLC connections exist.~~
~~3.~~1. ~~It is clarified that for uni-directional RB, one UM or TM RLC connection exists.~~

1. It is clarified that for AM, there is only one RLC entity per Radio Bearer.
2. It is clarified that for UM and TM, there is one or two RLC entities per Radio Bearer.

Impact analysis:

- Correction to a function where the specification was : ambiguous or not sufficiently explicit. Unclear configuration was clarified.
- Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ UEs implementing the current misleading model may not be able to operate PDCP on top of RLC.

Clauses affected: ⌘ 5.3.2.1

Y **N**

Other specs affected:	⌘	X		Other core specifications	⌘	25.323
			X	Test specifications		
			X	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/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) ~~2)~~ Obtain the latest version for the release of the specification to which the

3) 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.

5.3.2 RLC Services and Functions

This subclause provides an overview on services and functions provided by the RLC sublayer. A detailed description of the RLC protocol is given in [8].

5.3.2.1 Services provided to the upper layer

- **Transparent data transfer**. This service transmits upper layer PDUs without adding any protocol information, possibly including segmentation/reassembly functionality.
- **Unacknowledged data transfer**. This service transmits upper layer PDUs without guaranteeing delivery to the peer entity. The unacknowledged data transfer mode has the following characteristics:
  - Detection of erroneous data: The RLC sublayer shall deliver only those SDUs to the receiving upper layer that are free of transmission errors by using the sequence-number check function.
  - Immediate delivery: The receiving RLC sublayer entity shall deliver a SDU to the upper layer receiving entity as soon as it arrives at the receiver.
- **Acknowledged data transfer**. This service transmits upper layer PDUs and guarantees delivery to the peer entity. In case RLC is unable to deliver the data correctly, the user of RLC at the transmitting side is notified. For this service, both in-sequence and out-of-sequence delivery are supported. In many cases a upper layer protocol can restore the order of its PDUs. As long as the out-of-sequence properties of the lower layer are known and controlled (i.e. the upper layer protocol will not immediately request retransmission of a missing PDU) allowing out-of-sequence delivery can save memory space in the receiving RLC. The acknowledged data transfer mode has the following characteristics:
  - Error-free delivery: Error-free delivery is ensured by means of retransmission. The receiving RLC entity delivers only error-free SDUs to the upper layer.
  - Unique delivery: The RLC sublayer shall deliver each SDU only once to the receiving upper layer using duplication detection function.
  - In-sequence delivery: RLC sublayer shall provide support for in-order delivery of SDUs, i.e., RLC sublayer should deliver SDUs to the receiving upper layer entity in the same order as the transmitting upper layer entity submits them to the RLC sublayer.
  - Out-of-sequence delivery: Alternatively to in-sequence delivery, it shall also be possible to allow that the receiving RLC entity delivers SDUs to upper layer in different order than submitted to RLC sublayer at the transmitting side.
- **Maintenance of QoS as defined by upper layers.** The retransmission protocol shall be configurable by layer 3 to provide different levels of QoS. This can be controlled.
- **Notification of unrecoverable errors**. RLC notifies the upper layer of errors that cannot be resolved by RLC itself by normal exception handling procedures, e.g. by adjusting the maximum number of retransmissions according to delay requirements.

For AM RLC, there is only one RLC entity per Radio Bearer. For UM and TM RLC, there is one or two (one for each direction) RLC entities per Radio Bearer. ~~There is a single one or two~~ RLC ~~connections~~ per Radio Bearer. ~~An RLC connection is composed of two peer RLC entities. For bi-directional RB, one AM RLC connection or two UM or TM RLC connections exist. For uni-directional RB, one UM or TM RLC connection exists.~~

3GPP TSG-RAN WG2 #31 ***R2-022210***
Stockholm, Sweden, 19th-23th August, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.301 CR 068** ⌘**rev 1** ⌘ 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: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Clarification on RLC connection
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	18/08/2002
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)*
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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)
Rel-6 (Release 6)

Reason for change: ⌘ At the RAN2#30 meeting, it was agreed that one Radio Bearer can use two UM or TM RLC entities to support ~~bi-directional~~ real-time communication. Therefore, the sentence in 5.3.2.1, 'There is a single RLC connection per Radio Bearer', is misleading or even incorrect. This sentence needs to be clarified.

Summary of change: ⌘

~~1.It is clarified that an RLC connection is composed of two peer RLC entities.~~
~~2.It is clarified that – for bi-directional RB, one AM RLC connection or two UM or TM RLC connections exist.~~
~~3.~~1. ~~It is clarified that for uni-directional RB, one UM or TM RLC connection exists.~~

1. It is clarified that for AM, there is only one RLC entity per Radio Bearer.
2. It is clarified that for UM and TM, there is one or two RLC entities per Radio Bearer.

Impact analysis:

- Correction to a function where the specification was : ambiguous or not sufficiently explicit. Unclear configuration was clarified.
- Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ UEs implementing the current misleading model may not be able to operate PDCP on top of RLC..

Clauses affected: ⌘ 5.3.2.1

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	25.323
			X	Test specifications		
			X	O&M Specifications		

Other comments: ⌘

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5.3.2.1 Services provided to the upper layer

- **Transparent data transfer**. This service transmits upper layer PDUs without adding any protocol information, possibly including segmentation/reassembly functionality.
- **Unacknowledged data transfer**. This service transmits upper layer PDUs without guaranteeing delivery to the peer entity. The unacknowledged data transfer mode has the following characteristics:
  - Detection of erroneous data: The RLC sublayer shall deliver only those SDUs to the receiving upper layer that are free of transmission errors by using the sequence-number check function.
  - Immediate delivery: The receiving RLC sublayer entity shall deliver a SDU to the upper layer receiving entity as soon as it arrives at the receiver.
- **Acknowledged data transfer**. This service transmits upper layer PDUs and guarantees delivery to the peer entity. In case RLC is unable to deliver the data correctly, the user of RLC at the transmitting side is notified. For this service, both in-sequence and out-of-sequence delivery are supported. In many cases a upper layer protocol can restore the order of its PDUs. As long as the out-of-sequence properties of the lower layer are known and controlled (i.e. the upper layer protocol will not immediately request retransmission of a missing PDU) allowing out-of-sequence delivery can save memory space in the receiving RLC. The acknowledged data transfer mode has the following characteristics:
  - Error-free delivery: Error-free delivery is ensured by means of retransmission. The receiving RLC entity delivers only error-free SDUs to the upper layer.
  - Unique delivery: The RLC sublayer shall deliver each SDU only once to the receiving upper layer using duplication detection function.
  - In-sequence delivery: RLC sublayer shall provide support for in-order delivery of SDUs, i.e., RLC sublayer should deliver SDUs to the receiving upper layer entity in the same order as the transmitting upper layer entity submits them to the RLC sublayer.
  - Out-of-sequence delivery: Alternatively to in-sequence delivery, it shall also be possible to allow that the receiving RLC entity delivers SDUs to upper layer in different order than submitted to RLC sublayer at the transmitting side.
- **Maintenance of QoS as defined by upper layers.** The retransmission protocol shall be configurable by layer 3 to provide different levels of QoS. This can be controlled.
- **Notification of unrecoverable errors**. RLC notifies the upper layer of errors that cannot be resolved by RLC itself by normal exception handling procedures, e.g. by adjusting the maximum number of retransmissions according to delay requirements.

For AM RLC, there is only one RLC entity per Radio Bearer. For UM and TM RLC, there is one or two (one for each direction) RLC entities per Radio Bearer. ~~There is a single one or two~~ RLC ~~connections~~ per Radio Bearer. ~~An RLC connection is composed of two peer RLC entities. For bi-directional RB, one AM RLC connection or two UM or TM RLC connections exist. For uni-directional RB, one UM or TM RLC connection exists.~~

3GPP TSG-RAN WG2 #31 ***R2-022211***
Stockholm, Sweden, 19th-23th August, 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.301 CR 069** ⌘**rev 1** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Clarification on RLC connection
Source:	⌘	TSG RAN WG2
Work item code:	⌘	TEI
Date:	⌘	18/08/2002
Category:	⌘	**A**
Release:	⌘	Rel-5

Use one of the following categories:
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Rel-4 (Release 4)
Rel-5 (Release 5)
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Reason for change: ⌘ At the RAN2#30 meeting, it was agreed that one Radio Bearer can use two UM or TM RLC entities to support ~~bi-directional~~ real-time communication. Therefore, the sentence in 5.3.2.1, 'There is a single RLC connection per Radio Bearer', is misleading or even incorrect. This sentence needs to be clarified.

Summary of change: ⌘

~~1.It is clarified that an RLC connection is composed of two peer RLC entities.~~
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~~3.~~1. ~~It is clarified that for uni-directional RB, one UM or TM RLC connection exists~~
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Impact analysis:

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Consequences if not approved: ⌘ UEs implementing the current misleading model may not be able to operate PDCP on top of RLC.

Clauses affected: ⌘ 5.3.2.1

Y **N**

Other specs affected:	⌘	X		Other core specifications	⌘	25.323
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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