

TSG-RAN Meeting #17
Biarritz, France, 3 - 6 September 2002

RP-020536

Title: Agreed CRs (Release '99 and Rel-4/Rel-5 category A) to TS 25.301
Source: TSG-RAN WG2
Agenda item: 7.2.3

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Versio	Versio
R2-022209	agreed	25.301	067		R99	Clarification on RLC connection	F	3.10.0	3.11.0
R2-022210	agreed	25.301	068		Rel-4	Clarification on RLC connection	A	4.3.0	4.4.0
R2-022211	agreed	25.301	069		Rel-5	Clarification on RLC connection	A	5.1.0	5.2.0

CHANGE REQUEST

⌘ **25.301 CR 067** ⌘ rev **-** ⌘ 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:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	Date:	⌘ 18/08/2002
Category:	⌘ F	Release:	⌘ R99
	Use <u>one</u> of the following categories:		Use <u>one</u> 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 be found in 3GPP TR 21.900 .		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. <u>1. It is clarified that for AM, there is only one RLC entity per Radio Bearer.</u> <u>2. It is clarified that for UM and TM, there is one or two RLC entities per Radio Bearer.</u> Impact analysis: <ul style="list-style-type: none"> · 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:	⌘ Stage 2 and stage 3 may not be aligned. For CS domain, bi-directional voice communication is not supported. For PS domain, bi-directional real-time packet communication is not supported.

Clauses affected:	⌘ 5.3.2.1
	<input type="checkbox"/> Y <input type="checkbox"/> N

Other specs affected:	⌘	<input checked="" type="checkbox"/>	Other core specifications	⌘	25.323
		<input checked="" type="checkbox"/>	Test specifications		
		<input checked="" type="checkbox"/>	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) ~~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.

CHANGE REQUEST

⌘ **25.301 CR 068** ⌘ rev **-** ⌘ 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 <u>one</u> of the following categories:		Use <u>one</u> 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 be found in 3GPP TR 21.900 .		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. <u>1. It is clarified that for AM, there is only one RLC entity per Radio Bearer.</u> <u>2. It is clarified that for UM and TM, there is one or two RLC entities per Radio Bearer.</u>
	Impact analysis:
	<ul style="list-style-type: none"> · 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:	⌘ Stage 2 and stage 3 may not be aligned. For CS domain, bi-directional voice communication is not supported. For PS domain, bi-directional real-time packet communication is not supported.

Clauses affected:	⌘ 5.3.2.1
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Other specs affected:		Y	N		
	⌘	X		Other core specifications	⌘ 25.323
			X	Test specifications	
			X	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.

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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.

CHANGE REQUEST

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

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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 <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
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	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
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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. 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 <u>1. It is clarified that for AM, there is only one RLC entity per Radio Bearer.</u> <u>2. It is clarified that for UM and TM, there is one or two RLC entities per Radio Bearer.</u>
	Impact analysis: <ul style="list-style-type: none"> · 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:	⌘ Stage 2 and stage 3 may not be aligned. For CS domain, bi-directional voice communication is not supported. For PS domain, bi-directional real-time packet communication is not supported.

Clauses affected:	⌘ 5.3.2.1
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Other specs affected:		Y	N		
	⌘	X		Other core specifications	⌘ 25.323
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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