TSG-RAN Meeting #10 *RP-000579*
Bangkok, Thailand, 6 - 8 December 2000

Title: **Agreed CRs to TS 34.109**

Source: **TSG-RAN WG2**

Agenda item: **5.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Subject	Cat	Version	Versio
R2-002428	agreed	34.109	005	1	Setting up UE test loop for multiple radio bearer configurations	F	3.1.0	3.2.0

3GPP RAN WG2 Meeting #17
Sophia Antipolis, France, 13 – 17 Nov, 2000

***Document* R2-002428**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.109	**CR**	**005r1**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-RAN #10	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]
(at least one should be marked with an X)

Source: TSG-RAN WG2 **Date:** 16-11-2000

Subject: Setting up UE test loop for multiple radio bearer configurations.

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The UE test loop (mode 1) is intended to be used for radio bearer configurations having multiple radio bearers. The command CLOSE UE TEST LOOP CMD can be used to set the UL RLC SDU size to be used for returning data. For the SS to unambiguously set-up which radio bearer should use which UL RLC SDU size the radio bearer identity need to be included in the set-up message.
Value range for RBs corrected

Clauses affected:

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

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<--------- double-click here for help and instructions on how to create a CR.

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5 Test Control (TC) protocol procedures and test loop operation

5.1 General description

The UE test loop function provides access to isolated functions of the UE via the radio interface without introducing new physical interfaces just for the reason of conformance testing.

NOTE 1: It should be emphasised that the UE test loop function only describes the functional behaviour of the UE with respect to its external interfaces; physical implementation of the UE test loop function is completely left open to the manufacturer.

The UE test loop function is activated by transmitting the appropriate Test Control (TC) message to the UE, see clause 6.

The UE test loop function can be operated in two different loopback modes:

- UE test loop mode 1; and
- UE test loop mode 2.

Figure 5.1.1 shows a functional block diagram of UE test loop function for mode 1.

For UE test loop mode 1 the loopback point is located above Layer 2. Depending on the actual radio bearer setup loopback is performed of RLC SDUs or PDCP SDUs according to the procedure specified in clause 5.3.3.2.

The loop back point for UE test loop mode 1 has been selected above Layer 2 to separate the protocol configurations from the UE test loop function. By configuration of RLC and MAC layers other loop back points may functional be achieved. E.g. by transparent configuration of RLC and MAC layer functional loop back point at Transport channel level can be achieved to implement the reference measurement channels as specified by [3] TS 25.101, Annex A for FDD and by [4] TS 25.102, Annex A for TDD.

For UE test loop mode 2 both data and CRC are looped back. UE test loop mode 2 is intended for Blind Transport Format Detection (BTFD) testing and BLER testing of DL 12.2 kbps reference measurement channel for which loopback of downlink CRC is required. UE test loop mode 2 can also be used for BLER testing of DL 64, 144 and 384 kbps reference measurement channels if the UE supports correspondent UL reference measurement channels. Both received data and CRC bits for the DCH transport channel used for the BTFD test case is returned according to the procedure specified in clause 5.3.3.3.

A specific radio ~~beaerer~~bearer test mode is specified to be used together with the UE test loop function. The purpose of the radio bearer test mode is to put the UE into a mode where: SS can set up radio bearers to be terminated in the UE test loop function without having to involve CC or SM; and to disable any control mechanisms in NAS protocols or in any UE applications that otherwise could cause the RRC connection to be released.

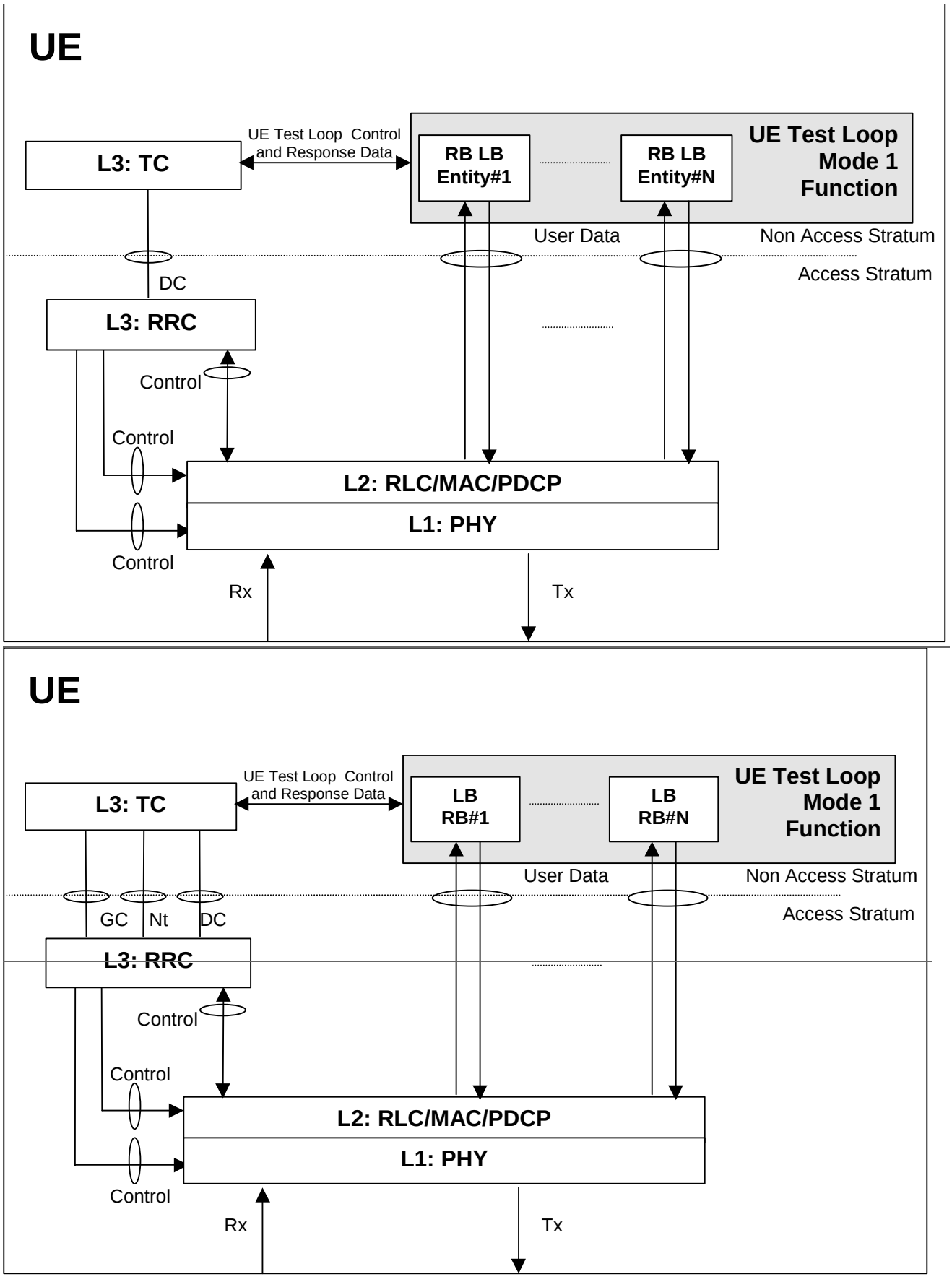

Figure 5.1.1: UE Test Loop Mode 1 function (TC =Test Control, LB = Loop Back entity)

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5.3.2 Close UE test loop

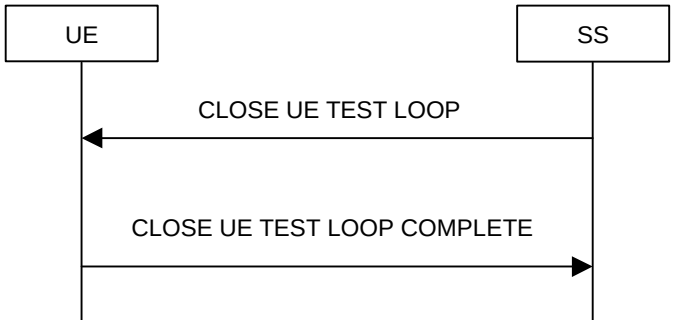

Figure 5.3.2.1: Close UE test loop procedure

5.3.2.1 General

The SS uses the close UE test loop procedure to start the UE Test Loop function in the UE. A prerequisite is that a RAB has been established between SS and UE. See [10] TS 34.108, clause 7 for generic setup procedures.

The UE shall provide for normal Uu layer 1, layer 2 and RRC functionality while the UE test loop function is active. This includes (but is not limited to) handover procedures and normal disconnection of the radio bearer. The loopback shall be maintained across handovers, but after RAB disconnection, the loopback shall cease to exist.

5.3.2.2 Initiation

The SS requests the UE to close its radio bearer test loop by transmitting a CLOSE UE TEST LOOP message. The SS then starts timer TT01.

5.3.2.3 Reception of CLOSE UE TEST LOOP message by the UE

If no radio bearer is established, the UE shall ignore any CLOSE UE TEST LOOP message.

If a radio bearer is established, the UE shall close the test loop and then send back to the SS a CLOSE UE TEST LOOP COMPLETE message. The loopback should be operational prior to the sending of the acknowledge.

If the test loop is already closed, the UE shall still respond as if the loop had been open, i.e the CLOSE UE TEST LOOP COMPLETE message should be sent.

If UE test mode 1 have been selected then the loop back scheme according to 5.3.2.6 shall be performed by the UE.

If UE test mode 2 have been selected then the loop back scheme according to 5.3.2.7 shall be performed by the UE.

5.3.2.4 Reception of CLOSE UE TEST LOOP COMPLETE message by the SS

Upon reception of the CLOSE UE TEST LOOP COMPLETE message the SS stops timer TT01.

5.3.2.5 TT01 timeout

If TT01 expires, then the SS shall indicate this to the test case. The procedure is then completed.

5.3.2.6 UE test loop mode 1 operation

If the configuration of a radio bearer includes the PDCP protocol layer then the loop back scheme according to 5.3.2.6.1 shall be performed by the UE for the actual radio bearer.

If the PDCP protocol layer is not used for a radio bearer then the loop back scheme according to 5.3.2.6.2 shall be performed by the UE for the actual radio bearer.

5.3.2.6.1 Loopback of PDCP SDUs

If UE test mode 1 have been selected and the radio bearer setup includes configuration of PDCP protocol layer then the following loop back scheme shall be performed by the UE:

After the UE has closed its radio bearer test loop, every PDCP SDU received by the UE on the active radio bearer (downlink) shall be taken from the output of the PDCP service access point (SAP) and be input to the correspondent PDCP SAP and transmitted (uplink).

The UE shall provide for normal PDCP operation.

The PDCP loopback operation is illustrated in figure 5.3.2.6.1.1.

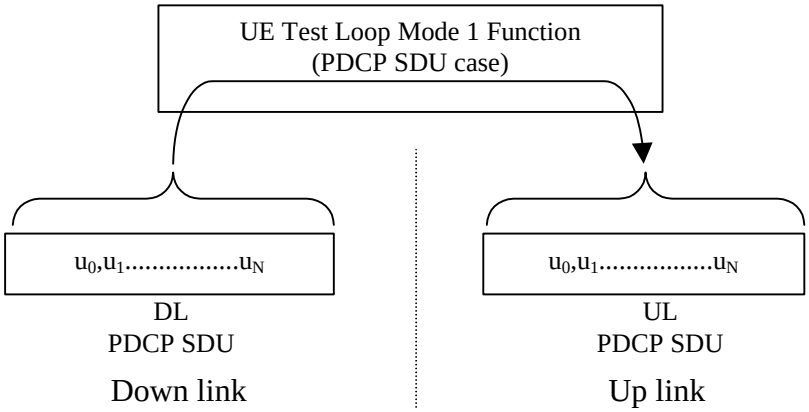

Figure 5.3.2.6.1.1: Loop back of PDCP SDU

5.3.2.6.2 Loopback of RLC SDUs

If UE test mode 1 have been selected and radio bearer setup does not include configuration of PDCP protocol layer then the following loop back scheme shall be performed by the UE:

After the UE has closed its radio bearer test loop, every user data block received by the UE on the active radio bearer (downlink) shall be taken from the output of the RLC service access point (SAP) and be input to the correspondent RLC SAP and transmitted (uplink). The UE reads the UL RLC SDU size parameter from the "LB Setup RB IE#k~~RAB subflow#k~~" parameter associated with the radio bearer, see 6.2.

If no "LB Setup RB IE#k~~RAB subflow#k~~" parameter is associated with the radio bearer then the UE shall use the same UL RLC SDU size as the received DL RLC SDU.

For the case when the "UL RLC SDU size" parameter is set to "0" no data shall be returned.

For the case when the "UL RLC SDU size" parameter is set to the same value as the down link (DL) RLC SDU block size then the complete user data block shall be returned, see figure 5.3.2.6.2.1.

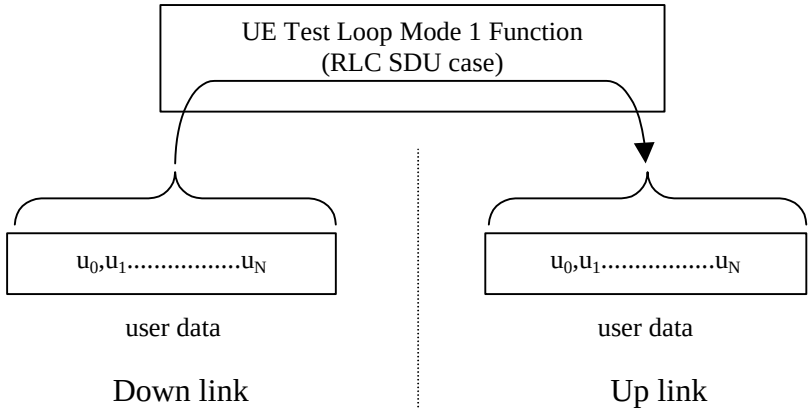

Figure 5.3.2.6.2.1: DL and UL RLC SDU block size equal
(DL RLC SDU size = UL RLC SDU size = N+1)

For the case when the "UL RLC SDU size" parameter is set to a value less than the down link (DL) RLC SDU block size then the UE shall return the first K bits of the received block, where K is the UL block size, see figure 5.3.2.6.2.2.

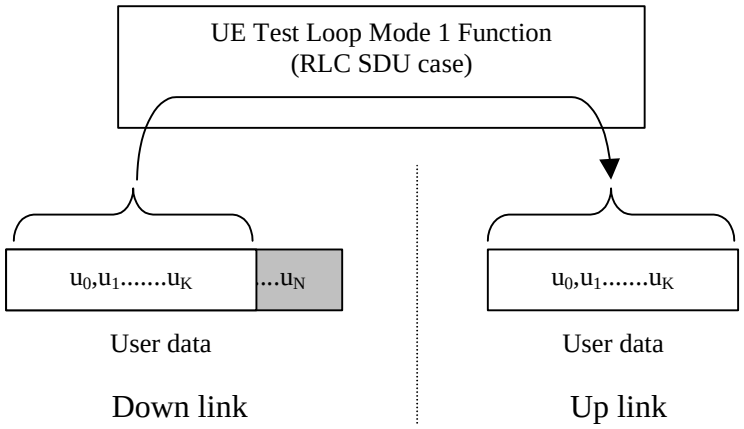

Figure 5.3.2.6.2.2: DL > UL RLC SDU block size
(DL RLC SDU size = N+1, UL RLC SDU size = K+1)

For the case when the "UL RLC SDU size" parameter is set to a value bigger than the down link (DL) RLC SDU block size then the UE shall pad the UL send block by repeating the received data block until the UL send block has been filled (truncating the last block if necessary), see figure 5.3.2.6.2.3.

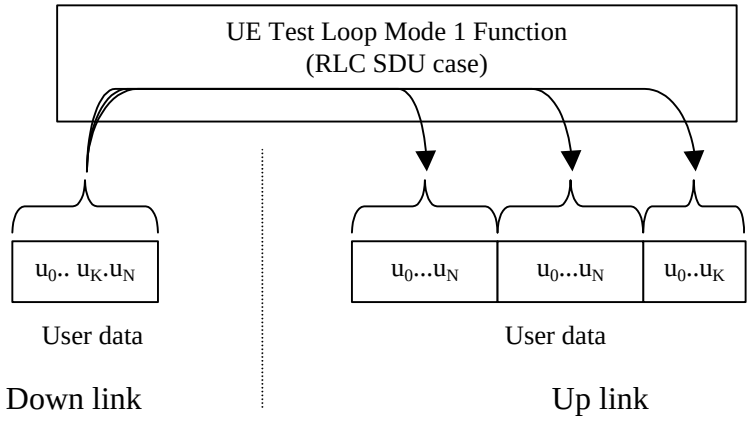

Figure 5.3.2.6.2.3: DL < UL RLC SDU block size
(DL RLC SDU size = N+1, UL RLC SDU size = 2*(N+1) + (K+1))

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5.3.3 Open UE test loop

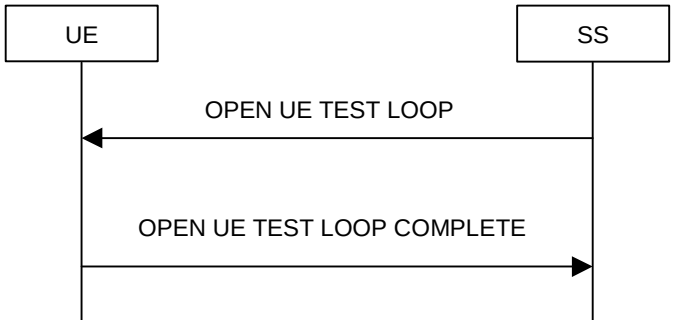

Figure 5.3.3.1: Open UE test loop procedure

5.3.3.1 General

The SS uses the procedure open UE test loop to deactivate the UE test loop function in the UE.

5.3.3.2 Initiation

The SS requests the UE to open its radio bearer test loop by transmitting a OPEN_UE_TEST _LOOP_CMD message. The SS then starts timer TT01.

5.3.3.3 Reception of OPEN UE TEST LOOP message by the UE

If no radio bearer is established, the UE shall ignore any OPEN UE TEST LOOP message.

If a radio bearer is established, the UE shall open the test loop and send back to the SS a OPEN UE TEST LOOP COMPLETE message.

If the test loop is already open, the UE shall still respond as if the loop had been closed, i.e the OPEN UE TEST LOOP COMPLETE~~OPEN_UE_LOOP_ACK~~ message should be sent prior to TT01 expiring.

5.3.3.4 Reception of OPEN UE TEST LOOP COMPLETE by the SS

Upon reception of the OPEN UE TEST LOOP COMPLETE message the SS stops timer TT01.

5.3.3.5 TT01 timeout

If TT01 expires, then the SS shall indicate this to the test case. The procedure is then completed.

6 Message definitions and contents

In this clause, only TC protocol messages are described. TC control messages are ~~intented~~intended to be sent using the RRC downlink and uplink direct transfer procedures, see [14] TS 25.331 clause 8.1.9 and clause 8.1.10.

NOTE 1: A message received with skip indicator different from 0 will be ignored.

NOTE 2: For general definition of Layer 3 message format see [1] TS 24.007 subclause 11.

NOTE 3: GSM and 3G test messages uses the same protocol discriminator value ("1111"). Following message type value series are reserved for GSM testing commands as specified by [13] GSM 04.14: 0000xxxx, 0001xxxx and 0010xxxx where x represent 0 or 1. For 3G test commands the message type value series 0100xxxx is reserved.

6.1 Timer values

TT01: Recommended value: 2,5 seconds.

6.2 CLOSE UE TEST LOOP

This message is only sent in the direction SS to UE.

Information Element	Reference	Presence	Format	Length
Protocol discriminator	[1] TS 24.007, 11.2.3.1.1	M	V	½
Skip indicator	[1] TS 24.007, 11.2.3.1.2	M	V	½
Message type		M	V	1
UE test loop mode		M	V	1
UE test loop mode 1 LB setup		C	LV	1-13

where message type is:

8	7	6	5	4	3	2	1	bit no.
0	1	0	0	0	0	0	0	octet 1

where UE test loop mode is:

8	7	6	5	4	3	2	1	bit no.
0	0	0	0	0	Y1	X2	X1	octet 1

X2=0 and X1=0 then UE test loop mode 1 loop back scheme according to 5.3.2.6 shall be performed by the UE (loopback of RLC SDUs or PDCP SDUs).

X2=0 and X1=1 then UE test loop mode 2 loop back scheme according to 5.3.2.7 shall be performed by the UE (loopback of transport block data and CRC bits).

Y1 =0 then the DCCH dummy transmission according to 5.3.2.8 shall be disabled.

Y1 =1 then the DCCH dummy transmission according to 5.3.2.8 shall be enabled.

where UE test loop mode 1 LB setup is:

8	7	6	5	4	3	2	1	
Length of UE test loop mode 1 LB setup IE								Octet 1
LB setup list								Octet 2 Octet N*3+1

N is the number of LB entities in the LB setup list and is less than or equal to 4.

where LB setup list is:

8	7	6	5	4	3	2	1	
LB setup RB IE#1~~RAB subflow#1~~								Octet 2 Octet 3 Octet 4
LB setup RB IE#2~~RAB subflow#2~~								Octet 5 Octet 6 Octet 7
…								
LB setup RB IE#N~~RAB subflow#N~~								Octet N*3-1 Octet N*3 Octet N*3+1

where LB Setup RB IE#k~~RAB subflow#k~~ is:

8	7	6	5	4	3	2	1	bit no.
0	0	Z13	Z12	Z11	Z10	Z9	Z8	octet 1
Z7	Z6	Z5	Z4	Z3	Z2	Z1	Z0	octet 2
Reserved			Q4	Q3	Q2	Q1	Q0	octet 3

Z13..Z0 = Uplink RLC SDU size in bits 0..16383 (binary coded, Z13 is most significant bit and Z0 least significant bit), see Note 1.

Q4..Q0 = RB identity number, 5..32 (binary coded, Q4 is most significant bit and Q0 least significant bit), where RB identity identifies the radio bearer, see [14] TS 25.331. The range is limited to 5..32 due to RB0 to RB4 are reserved for signalling radio bearers.

NOTE 1 The parameter UL RLC SDU size is only applicable for UE test loop mode 1 and for radio bearers~~RAB subflows~~ not using the PDCP protocol layer, see 5.3.2.6.2.

6.3 CLOSE UE TEST LOOP COMPLETE

This message is only sent in the direction UE to SS.

Information Element	Reference	Presence	Format	Length
Protocol discriminator	[1] TS 24.007, 11.2.3.1.1	M	V	1/2
Skip indicator	[1] TS 24.007, 11.2.3.1.2	M	V	1/2
Message type		M	V	1

where message type is:

8	7	6	5	4	3	2	1	bit no.
0	1	0	0	0	0	0	1	Octet 1

6.4 OPEN UE TEST LOOP

This message is only sent in the direction SS to UE

Information Element	Reference	Presence	Format	Length
Protocol discriminator	[1] TS 24.007, 11.2.3.1.1	M	V	½
Skip indicator	[1] TS 24.007, 11.2.3.1.2	M	V	½
Message type		M	V	1

where message type is:

8	7	6	5	4	3	2	1	Bit no.
0	1	0	0	0	0	1	0	Octet 1

~~where Acknowledge Information Element Identifier is:~~

~~8~~	~~7~~	~~6~~	~~5~~	~~4~~	~~3~~	~~2~~	~~1~~	~~Bit no.~~
~~1~~	~~0~~	~~0~~	~~0~~					~~Octet 1~~

~~and the Acknowledge Information Element contents are:~~

				~~4~~	~~3~~	~~2~~	~~1~~	~~Bit no.~~
				~~0~~ ~~spare~~	~~0~~ ~~spare~~	~~0~~ ~~spare~~	~~1~~	~~Octet 1~~

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