Source: **T1**

Title: **CR's to TS 34.109 v3.0.0 for approval**

Agenda item: **6.1**

Document for: **Approval**

This document contains 4 CRs to TS 34.109 v3.0.0. These CRs have been agreed by T1 and are put forward to TSG T for approval.

CRs due to adding/updating/correction of tests:

T1 Doc	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New
T1-000151	34.109	001		R99	Clarification of UE test loop mode 2 loop back scheme	C	3.0.0	3.1.0
T1-000152	34.109	002		R99	Clarification of loopback delay requirement	F	3.0.0	3.1.0
T1-000153	34.109	003		R99	Change Request about specification TS 34.109	F	3.0.0	3.1.0
T1-000154	34.109	004		R99	UE test loop mode 1, loopback of PDCP SDUs	C	3.0.0	3.1.0

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

Document T1-000151
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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34.109	CR	001	Current Version:	3.0.0

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

For submission to: T#9	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic		

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

Source: T1/RF **Date:** 2000-08-31

Subject: Clarification of UE test loop mode 2 loop back scheme

Work item:

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

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	X
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The UE behaviour for UE test loop mode 2 needs to be clarified for the case when variable rate is used in uplink.

Clauses affected: 5.3.2.7, 5.3.2.7.1, A.2, A.6 (new), A.7 (was A.6)

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.

5.3.2.7 UE test loop mode 2 operation

For UE test loop mode 2 to work correctly ciphering shall be disabled.

For UE to be able to return downlink transport block data and CRC bits then ~~and~~ the up link transport channel configuration shall include a transport format for which the block size is ~~shall be~~ equal or bigger than the sum of the downlink transport block size and the number of downlink CRC bits. If no such uplink transport format exists then the returned data and CRC bits will be truncated.

5.3.2.7.1 Loopback of downlink transport block data and downlink CRC

If UE test mode 2 have been selected then the following loop back scheme shall be performed by the UE:

After the UE has closed the test loop then the UE shall copy the received downlink transport block and CRC bits to the up link transport block and transmit in the up link.

If the uplink radio bearer configuration is of variable rate then the transport format with the smallest transport block size which fits the downlink transport block size and the downlink CRC bits shall be selected in uplink. In case there is no transport format that fits the downlink transport block data and the downlink CRC bits then the data and CRC bits shall be truncated using the transport format with the biggest transport block size.

UE test mode 2 operation is illustrated for the case when uplink transport block size is bigger than the sum of downlink transport block size and size of downlink CRC in figure 5.3.2.7.1.~~BTFD 1.95kbps transport case in figure 5.3.2.7.1; for the 7.95kbps transport case in figure 5.3.2.7.2; and for the 12.2 kbps transport case in figure 5.3.2.7.3.~~

UE test mode 2 operation is illustrated for the case when uplink transport block size is smaller than the sum of downlink transport block size and size of downlink CRC in figure 5.3.2.7.2.~~for the 12.2 kbps BLER measurement case in figure 5.3.2.7.4.~~

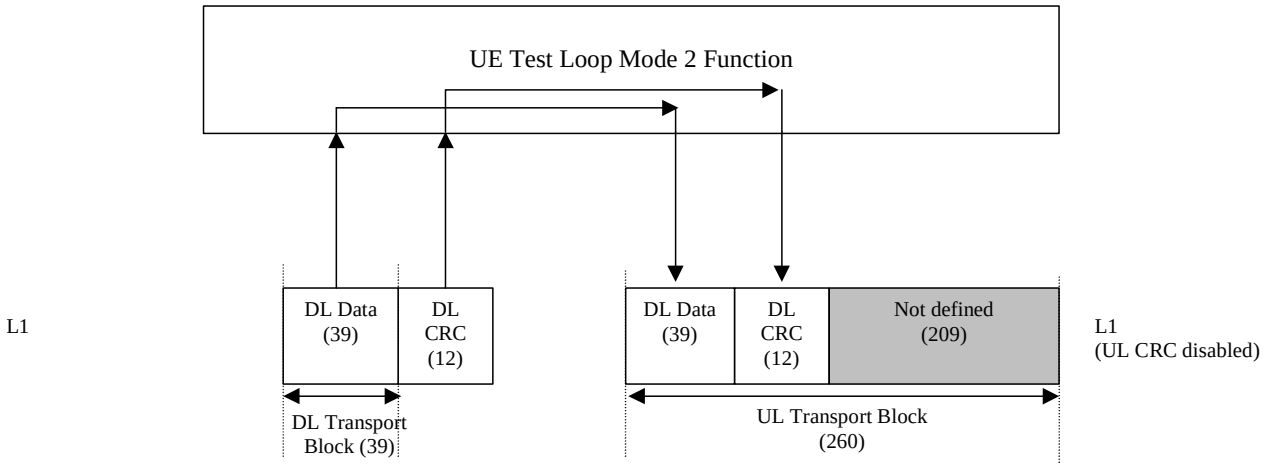


Figure 5.3.2.7.1. UE test loop mode 2 operation for the case when uplink transport block size is bigger than the sum of downlink transport block size and size of downlink CRC~~1.95 kbps transport format case~~

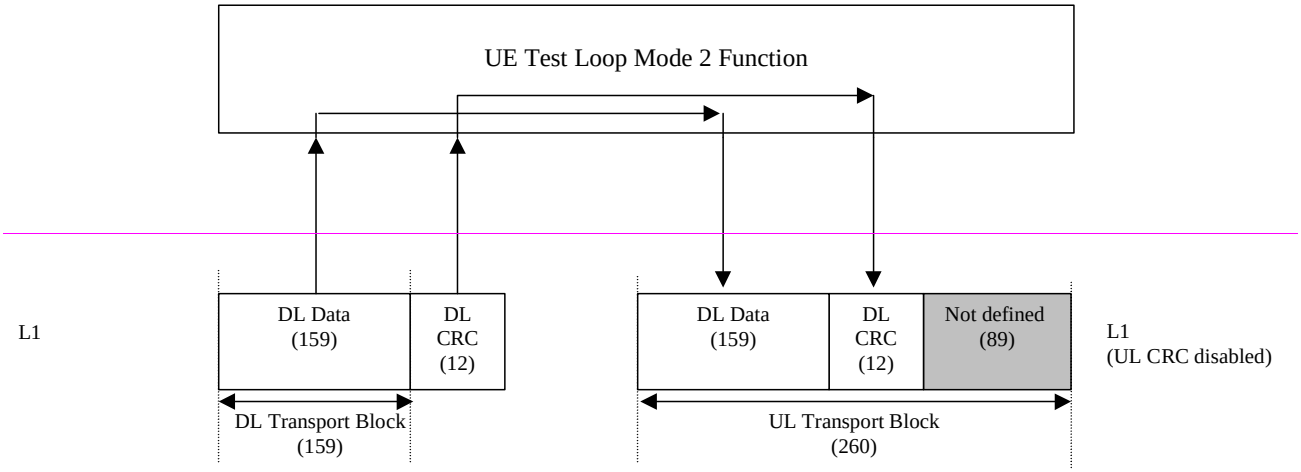


Figure 5.3.2.7.3. UE test loop mode 2 operation for the 7.95 kbps transport format case

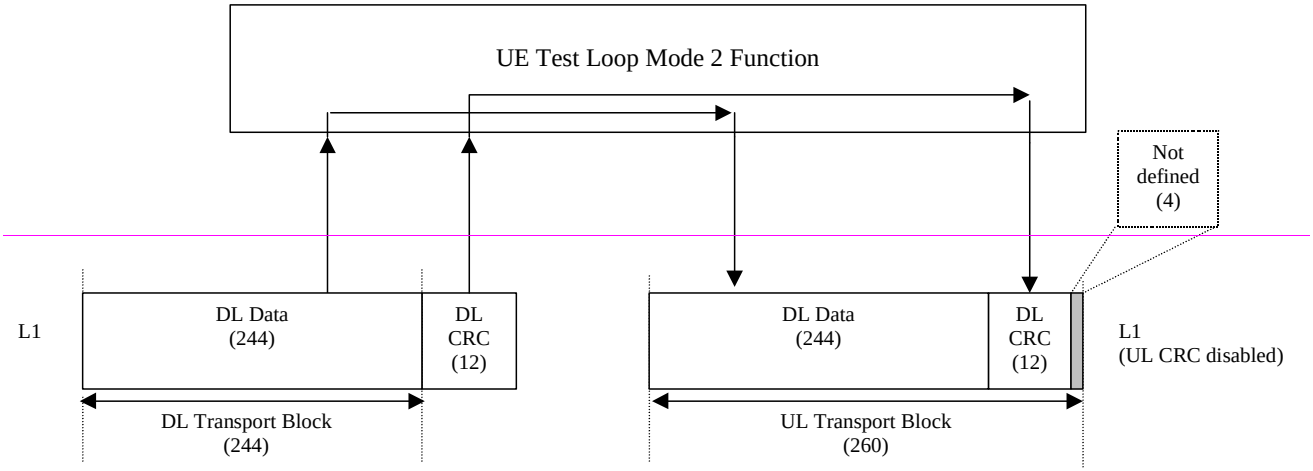


Figure 5.3.2.7.3. UE test loop mode 2 operation for the 1.95 kbps transport format case

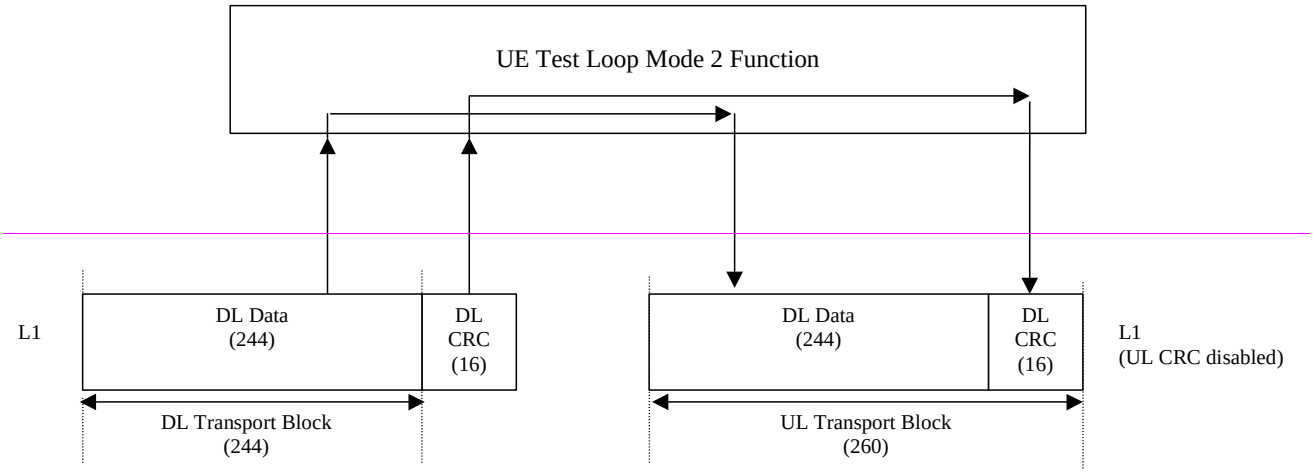


Figure 5.3.2.7.4. UE test loop mode 2 operation for the 12.2 kbps BLER measurement case

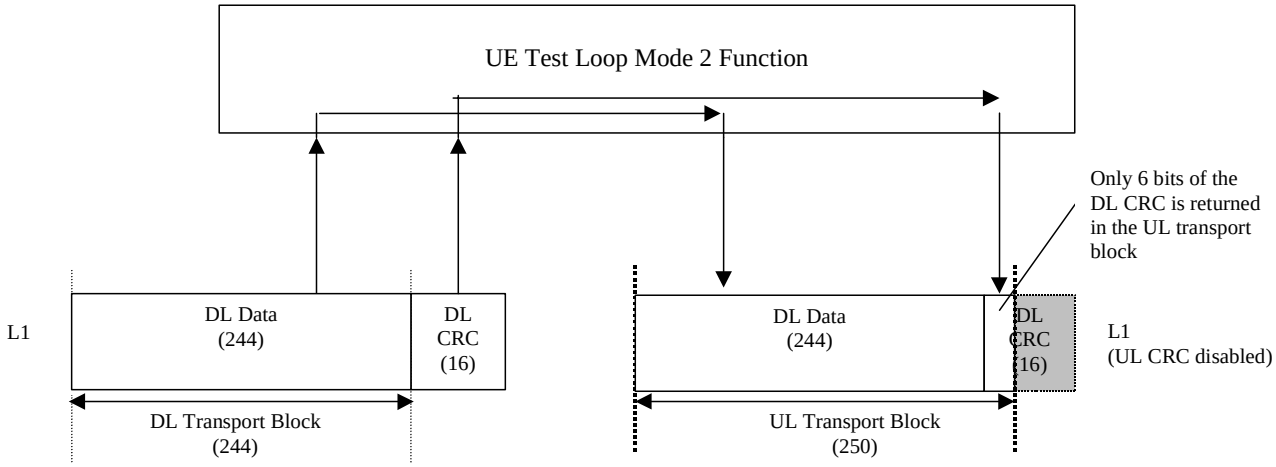


Figure 5.3.2.7.2. UE test loop mode 2 operation for the case when uplink transport block does not fit downlink transport block and downlink CRC bits.

< END OF CHANGED CLAUSE>

Annex A (informative): UE test loop use scenarios

A.1 Measurement of receiver characteristics (BER) using UE test loop mode 1 and RLC TM

SS can use the UE test loop mode 1 and RLC TM for measuring BER. For UE to be able to return all data it receives form SS it is required that the DL and UL transport block size are the same. It is also required that the UL RLC SDU size parameter of the CLOSE UE TEST LOOP message is set to the same value as the DL and UL transport block size.

A.1.1 Measurement of receiver characteristics (BER) - DL reference measurement channel (12,2 kbps)

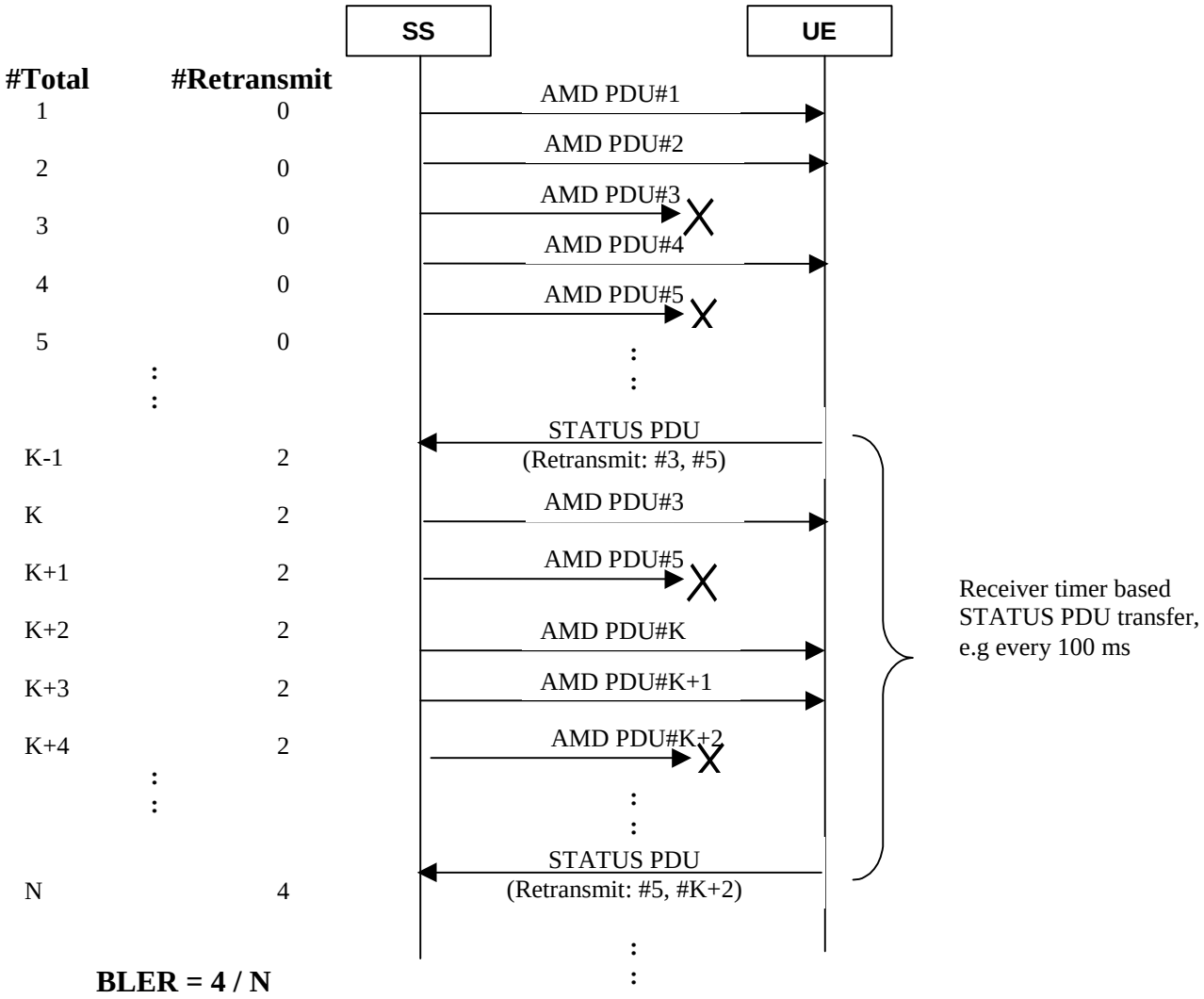
For measuring BER for the DL and UL reference measurement channel 12.2 kbps according to TS 34.121 Annex A the configuration should be:

- DL and UL transport block size = 244 bits (RLC TM)
- UE test loop mode 1 parameter UL RLC SDU size = 244 bits

A.2 Measurement of receiver performance (BLER) using UE test loop mode 1 and RLC AM

To measure BLER UE test loop mode 1 can be used by having the DL RLC protocol operating in acknowledged mode (AM). The SS can calculate BLER from the ratio of number of UE retransmission requests and the total number of blocks sent by the SS.

In AM the UE indicates missing protocol units (=transport blocks) in the STATUS PDU message. There are different triggers for sending the STATUS PDU message. For the purpose of SS BLER measurement a timer based trigger such as receiver timer based STATUS PDU transfer can be used (see TS 25.322 clause 9.7.2). The figure below illustrates the SS BLER measurement procedure. In the example in the figure block errors are detected by the UE of a total of N blocks. The BLER calculated by the SS is 4 / N.



#Total = Number of sent blocks,
#Retransmit = Number of UE retransmission requests

Figure A.2.~~3~~ 1 Measuring BLER using UE test loop mode 1 and DL RLC AM

A.2.1 Measurement of receiver performance (BLER) - DL reference measurement channel (64,144,384 kbps)

By having downlink transport block size set to size of user data part according to the 64, 144 or 384 kbps reference measurement channels and using RLC acknowledge mode the UE test loop mode 1 can be used to measure BLER.

A.3 Measurement of receiver performance (BLER) using UE test loop mode 2

In addition to the method described in A.2 UE test loop mode 2 can be used to measure BLER if the UL transport block size is bigger or equal to the sum of DL transport block size and number of DL CRC bits.

The SS can calculate BLER by checking returned data and CRC and count number of block errors and the total number of sent blocks.

A.3.1 Measurement of receiver performance (BLER) - DL reference measurement channel (12,2 kbps)

[3] TS 25.101 A.2.1 and A.2.2 defines the DL and UL reference measurement channel 12,2 kbps.

To be able to measure BLER using UE test loop mode 2 the SS needs to configure the uplink transport block size to 260 bits to fit downlink transport block size (244 bits) and downlink CRC bits (16 bits), see figure A.3.1.

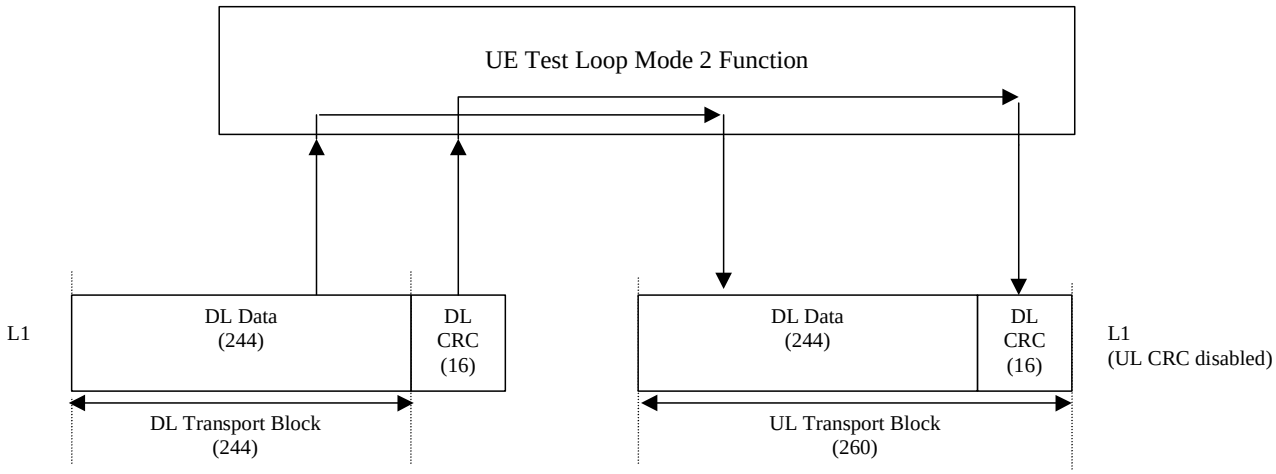


Figure A.3.1. UE test loop mode 2 operation for the 12.2 kbps BLER measurement case

A.3.2 Measurement of receiver performance (BLER) - DL reference measurement channel (64,144 and 384 kbps)

[3] TS 25.101 A.2.1 and A.2.2 defines the DL and UL reference measurement channel for 64, 144 and 384 kbps.

If an UE supports downlink reference measurement channels for 64,144 or 384 kbps and also the correspondent uplink reference measurement channel then it is possible to use UE test loop mode 2 for measuring BLER for these reference measurement channels.

A.4 Measurement of transmitter characteristics

The SS setups the radio bearer for DL and UL reference measurement channels 12,2 kbps using the generic setup procedure.

See [10] TS 34.108, clause 7~~[TBD]~~ for specification of the generic ~~call~~ setup procedure.

See [3] TS 25.101 A.2.1 and A.2.2 for definition of the DL and UL reference measurement channel 12,2 kbps.

The SS orders the UE to close its UE test loop by transmitting a CLOSE UE TEST LOOP CMD message.

When the SS receives the CLOSE UE TEST LOOP COMPLETE message from the UE the SS starts transmission of data to the UE.

Perform the transmitter test.

The SS sends the OPEN UE TEST LOOP message to the UE to open the UE test loop.

A.5 Measurement of transmitter DTX characteristics

The SS requests the UE to enable DTX and setups the radio bearer for DL and UL reference measurement channels 12,2 kbps using the generic setup procedure.

See [10] TS 34.108, clause 7~~[TBD]~~ for specification of the generic setup procedure.

See [3] TS 25.101 A.2.1 and A.2.2 for definition of the DL and UL reference measurement channel 12,2 kbps.

The SS orders the UE to close its UE test loop using UE test mode 1 by transmitting a CLOSE UE TEST LOOP message.

The UE confirms that the UE test loop is closed by sending the CLOSE UE TEST LOOP COMPLETE message to the SS.

Perform the transmitter DTX testing.

The SS sends the OPEN UE TEST LOOP message to the UE to open the UE test loop.

A.6 Using UE test loop mode 2 for testing of UE Blind Transport Format Detection

When an UE operates in UE test loop mode 2 then the received downlink transport block and the downlink CRC data bits shall be returned in the uplink transport block, see 5.3.2.7. The UE shall select the uplink transport format with the smallest transport block size, which fits both the received downlink transport block and the downlink CRC bits. Table A.6.1 gives an example of an uplink radio bearer configuration for variable rate having three transports formats TF0, TF1 and TF2. Table A.6.2 gives some examples of UE selected uplink transport format versus size of received downlink transport block and downlink CRC bits.

The SS can use UE test loop mode 2 for testing UE blind transport format detection by taken the possible downlink transport formats into consideration when configuring the uplink transport formats. I.e. for every downlink transport format there should be an uplink transport format for which the transport block size is equal to the sum of the downlink transport block size and the number of downlink CRC bits. Thus the SS can check the TFI of the UE transmitted transport format to verify that the UE has detected the correct downlink transport format. Table A.6.3 gives an example of a configuration for testing blind transport format detection using 9 possible downlink transport formats TF0 to TF8. The right hand column shows the minimum uplink transport block sizes the SS has to set-up to be able to test the UE blind transport format detection behaviour.

Table A.6.1: Uplink transport formats

UL transport format	Transport block size
TF0	0
TF1	55 bits
TF2	111 bits

Table A.6.2: Selected uplink transport format versus size of received downlink transport block and downlink CRC bits.

DL transport block size	Number of DL CRC bits	Selected UL TF	Comment
39 bits	16 bits	TF1	39+16=55 i.e. TF1 ok
40 bits	16 bits	TF2	TF1 not possible (40+16=56 > 55) TF2 OK (56 < 111)
95 bits	16 bits	TF2	TF2 OK (95+16=111)
96 bits	16 bits	TF2	96+16=112 is bigger than TF2 block size but no bigger TF available i.e. TF2 is selected and returned DL data and CRC is truncated (one bit of the DL CRC is not returned)

Table A.6.3: Example of configuration for testing behaviour of UE blind transport format detection.

DL TFI of DTCH		UL TFI of DTCH Minimum required UL transport block size if DL CRC size=12	
TF0	39 bits	TF0	51 bits (39+12)
TF1	95 bits	TF1	107 bits (95+12)
TF2	103 bits	TF2	115 bits (103+12)
TF3	118 bits	TF3	130 bits (118+12)
TF4	134 bits	TF4	146 bits (134+12)
TF5	148 bits	TF5	160 bits (148+12)
TF6	159 bits	TF6	171 bits (159+12)
TF7	204 bits	TF7	216 bits (204+12)
TF8	244 bits	TF8	256 bits (244+12)

A.7~~6~~ Using UE test loop mode 1 for protocol testing

The parameter UL RLC SDU in CLOSE UE TEST LOOP message is used to control the behaviour of the UE test function behavior regarding the uplink RLC SDU size.

In downlink the SS can control the downlink RLC SDU size by creating test data blocks of the size required for the test purpose.

~~The t~~Table A.7.1 ~~below~~ describes the UE test function behavior when operating in UE test loop mode 1 for different settings of DL and UL RLC SDU sizes:

Table A.7.1: UE test loop behaviour for different settings of DL and UL RLC SDU sizes.

UL RLC SDU size	UE test loop behaviour
= 0	Nothing is returned by UE in uplink
= DL RLC SDU size	All received data is returned by UE in uplink
< DL RLC SDU size	Received data is truncated by UE and sent in uplink
> DL RLC SDU size	Received data is repeated until UL RLC SDU block is filled and sent in uplink

Examples of different configurations are shown in figure 1 and 2 below.

Figure A.7.1~~A.2.1~~ illustrates a configuration for testing of RLC reassemble and segmentation. SS sends DL RLC SDU block size > DL RLC PDU block size and have configured UL RLC SDU block size = DL RLC SDU size > UL RLC PDU block size.

NOTE. For this type of configuration the UE receiver buffer limitations need to be considered when designing the test.

Figure A.7.2~~A.2.2~~ illustrates a configuration for BER measurements. SS sends DL RLC SDU block size = DL RLC PDU block size and have configured UL RLC SDU block size = UL RLC PDU block size = DL RLC PDU block size. RLC and MAC is configured for transparent mode.

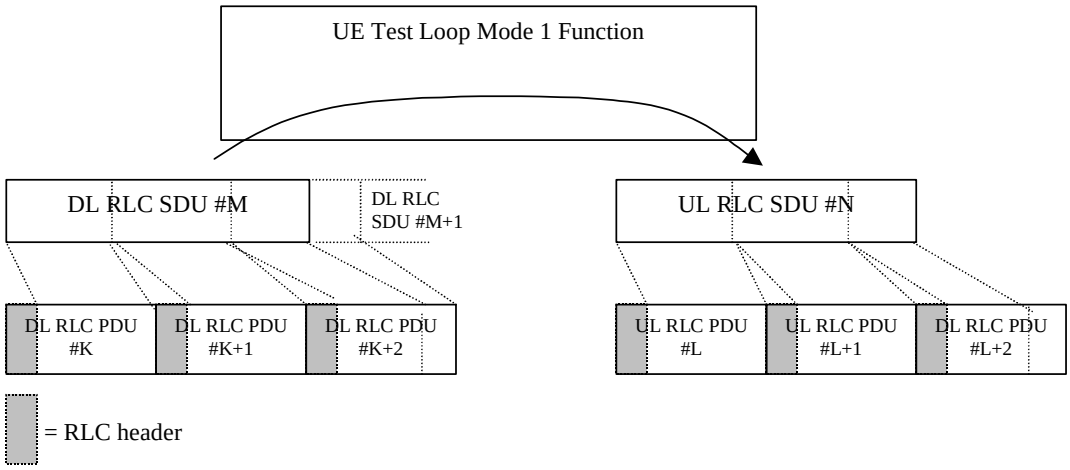


Figure A.7.1.~~A.2.1.~~ Configuration for testing of RLC reassemble in downlink and RLC segmentation in uplink.

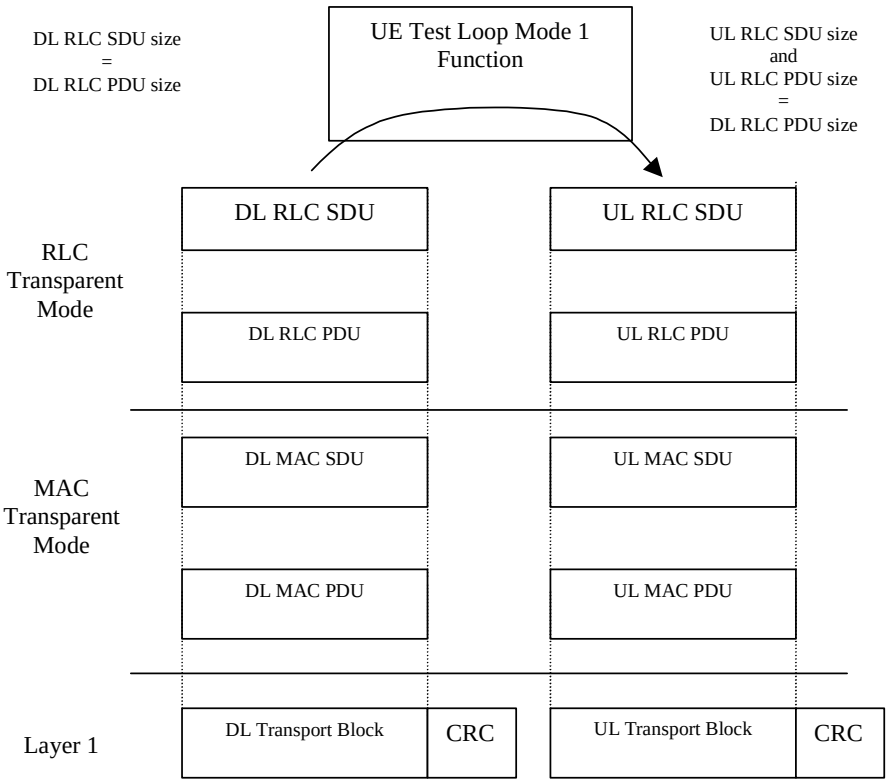


Figure A.7.2.~~A.2.2.~~ Example of a configuration used for BER measurement.

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34.109	CR	002	Current Version:	3.0.0

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

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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: T1/RF **Date:** 2000-08-31

Subject: Clarification of loopback delay requirement

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 applicability of the loopback delay requirement versus UE test loop modes need to be clarified. The figure illustrating the loopback delay requirement needs to be updated to be aligned with the text. Reference to figure and to clause in 25.133 needs to be corrected.

Clauses affected: 5.3.2.9

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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5.3.2.9 Loopback delay requirement

Loopback delay is specified as delay between received DL DTCH radio frames and their corresponding UL DTCH radio frames produced from the received data. The loopback delay is measured at the antenna connector of the UE and specified in the unit of radio frame(s). Timing offset between DL and UL radio frames, and timing errors are not included in the loopback delay.

For UE operating in UE test loop mode 1 the loopback delay requirement is applicable if the MAC and RLC protocols are configured for transparent operation and if the downlink RLC SDU size is equal to the downlink transport block size, i.e. no segmentation/concatenation takes place.

For UE operating in UE test loop mode 2 the loopback delay requirement is applicable independent of the radio bearer configuration.

While the UE test loop is closed and the radio bearer configuration is not changed, the UE shall maintain a fixed loopback delay (the loopback delay shall not vary during a test). The loopback delay shall not exceed the number of radio frames correspondent to 10 times the TTI of the actual transport channel configuration.

The loopback delay requirement for the 10ms TTI case is illustrated in figure 5.3.2.9.1~~4.5.1~~.

See [11] TS25.211 7.6.3 for definition of the timing offset between DL and UL radio frames.

See [12] TS25.133 7.1~~9.2~~ for definition of the timing error.

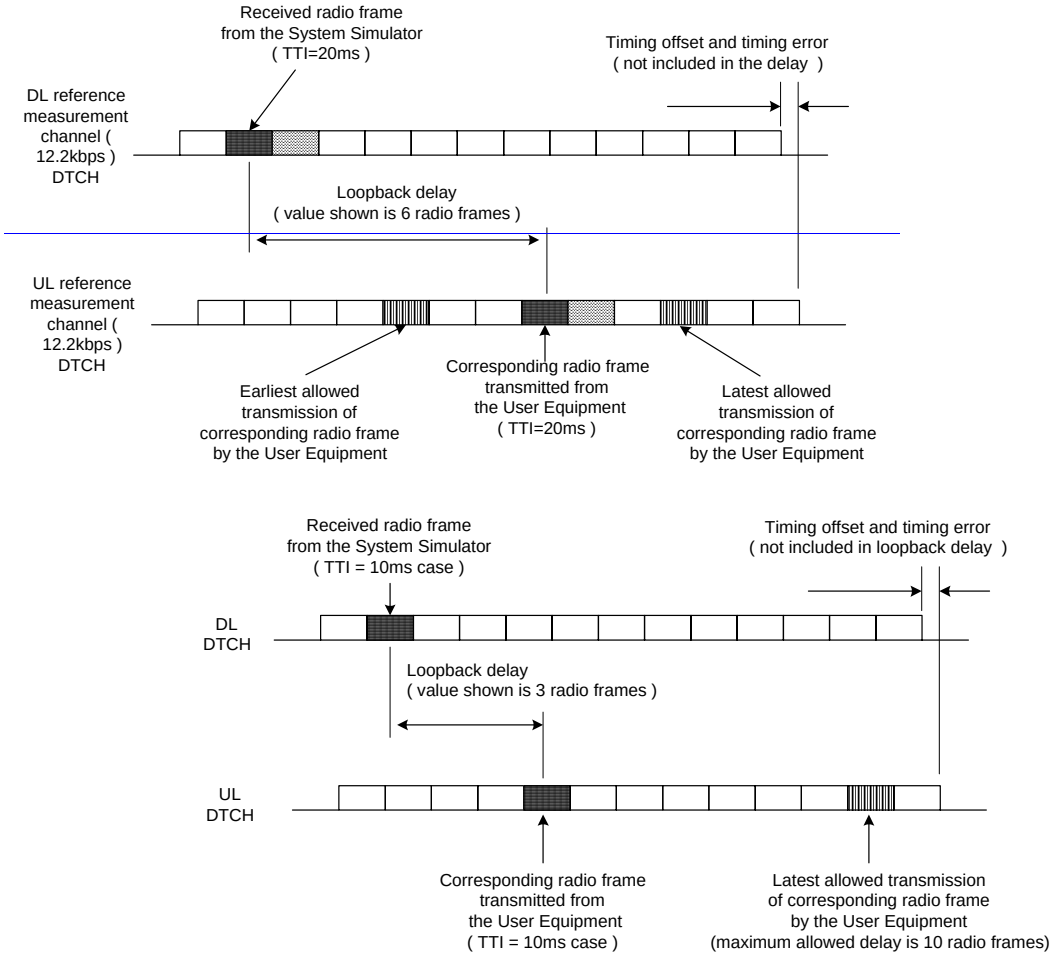

Figure 5.3.2.9.1: Loopback delay requirement (TTI=10 ms)

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or for SMG, use the format P-99-xxx

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34.109	**CR**	**003**	Current Version:	V3.0.0

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

For submission to:	T1#8	for approval	X	strategic		(for SMG use only)
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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: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [ ]

Source: T1/RF **Date:** 2000-08-31

Subject: Updating 34.109 v3.0.0 to TDD single mode

Work item: Conformance testing for UE (TDD)

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

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The proposal of this document is to update to TDD single mode, and to suggest some changes relating to the radio parameters in the same way as for FDD single mode.

Clauses affected: 1, 4.1, 5.3.2.3, 5.3.2.8, 5.3.2.9, 5.3.3.1, Annex A

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: T1R000234r1

1 Scope

The present document specifies for User Equipment (UE), ~~for 3rd Generation WCDMA system, those ME~~ in UMTS system, for FDD and TDD modes, those UE functions which are required for conformance testing purposes.
For conformance tests, functions are activated via the radio interface. These functions shall be capable of being activated when a test USIM is present. Any USIM related features such as subsidy-related UE features should also not interfere with the functions. In the loopback state, the UE shall be able to perform all functions specified in the present document except where otherwise stated; in addition however, the conformance testing functions must be operational. USIM, in general, is described in [7] TS 31.101. The ME recognizes the test USIM by the Administrative Data Field. Test USIM data fields are described in [10] TS 34.108.
The present document applies to the unit that includes the hardware to establish a connection across the radio interface.

4.1 General description

The SS performs activation and deactivation of the conformance test functions in the UE by sending standard NAS Layer 3 messages. A specific protocol discriminator value has been defined in [1] TS 24.007, 11.2.3.1.1 for the UE test command messages. Figure 4.1.1 illustrates the Layer 3 protocol entity Test Control (TC) where the UE test command messages terminates.

NOTE: The protocol discriminator value used for the TC messages is the same as used in GSM for the MS specific testing functions, see [13] GSM 04.14.

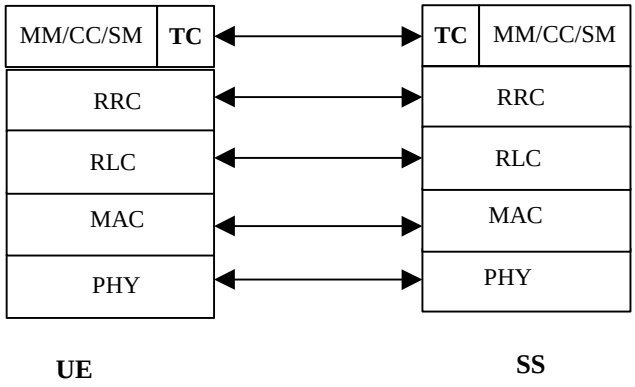


Figure 4.1.1: TC protocol termination (TC =Test Control).

Apart from sending the appropriate deactivation command to the UE the functions shall be deactivated by switching off the UE.
The following UE conformance testing functions can be activated (and deactivated):

- UE test loop function;
- UE radio bearer test mode
- Electrical Man Machine Interface (EMMI)

In addition to the conformance testing functions listed above there is a set of reference measurement channels that an UE need to support to enable RF conformance testing. The reference measurement channels are defined in [3] TS 25.101, Annex A for FDD and in [4] TS 25.102, Annex A for TDD.
Example of reference measurement channels (RMC) essential to all UEs supporting FDD or TDD are:

- UL 12.2kbps RMC (Reference Measurement Channel)
- DL 12.2kbps RMC

Example of reference measurement channels associated with UE service capabilities for FDD (DL and UL) and TDD (DL only) are:

- DL 64kbps RMC
- DL 144kbps RMC

- DL 384kbps RMC
- UL 64kbps RMC
- UL 144kbps RMC
- UL 384kbps RMC

5.3 UE test loop procedures

5.3.1 General

The UE test loop function is intended for:

- Testing of receiver characteristics based on BER (Bit Error Ratio) measurement. The SS calculates BER from a bit-by-bit comparison of data sent to and received from UE. BER measurement requires symmetric RAB bit-rates.
- Testing of receiver performance based on BLER (BLock Error Ratio) measurement. The SS calculates BLER based on the RLC STATUS SDU received from the UE operating in RLC acknowledged mode; or the SS calculates BLER based on checking returned downlink data and downlink CRC by UE operating in UE test loop mode 2.
- Testing of UE Blind Transport Format Detection.
- Testing of UE transmitter characteristics.
- Testing of UE transmitter DTX characteristics.
- Testing of radio bearers (UE test loop function emulates terminal equipment).

5.3.2 Close UE test loop

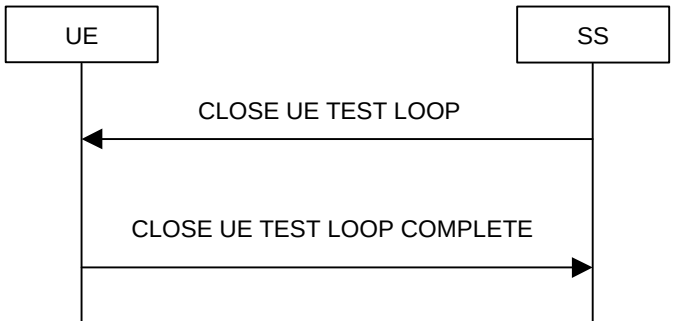


Figure 5.3.2.1: Close UE test loop procedure

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 ~~5.3.2.3.1~~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 ~~5.3.2.3.2~~5.3.2.7 shall be performed by the UE.

5.3.2.8 Transmission of dummy messages on DCCH

When UE test loop mode 1 or 2 is active:
If DCCH dummy mode is enabled and there is no DCCH data to be sent (i.e. there are no Layer 2/3 messages to be sent) then the UE shall set all bits in the uplink DCH transport block associated with a DCCH to 1, see figure 5.3.2.8.1.
If DCCH dummy mode is enabled the SS shall discard any received DCH transport blocks associated with a DCCH having its bits set to 1.

NOTE 1: DCCH dummy transmission is only intended for uplink RF testing for which reference radio measurement channels according to TS 25.101 Annex A for FDD mode and to TS 25.102 Annex A for TDD mode respectively are used.

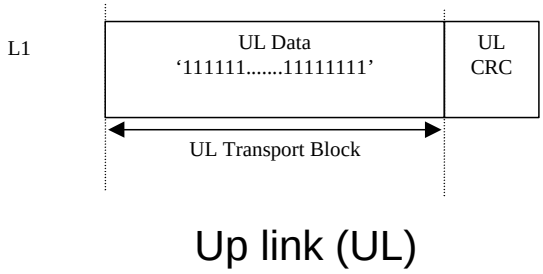


Figure 5.3.2.8.1. Bit pattern to use for DCCH dummy transmission

5.3.2.9 Loopback delay requirement (FDD mode)

Loopback delay is specified as delay between received DL DTCH radio frames and their corresponding UL DTCH radio frames produced from the received data. The loopback delay is measured at the antenna connector of the UE and specified in the unit of radio frame(s). Timing offset between DL and UL radio frames, and timing errors are not included in the loopback delay.
While the UE test loop is closed and the radio bearer configuration is not changed, the UE shall maintain a fixed loopback delay (the loopback delay shall not vary during a test). The loopback delay shall not exceed the number of radio frames correspondent to 10 times the TTI of the actual transport channel configuration.
The loopback delay requirement is illustrated in figure ~~5.3.4.5.1~~5.3.2.9.1.
See [11] TS25.211 7.6.3 for definition of the timing offset between DL and UL radio frames.

See [12] TS25.133 9.2 for definition of the timing error.

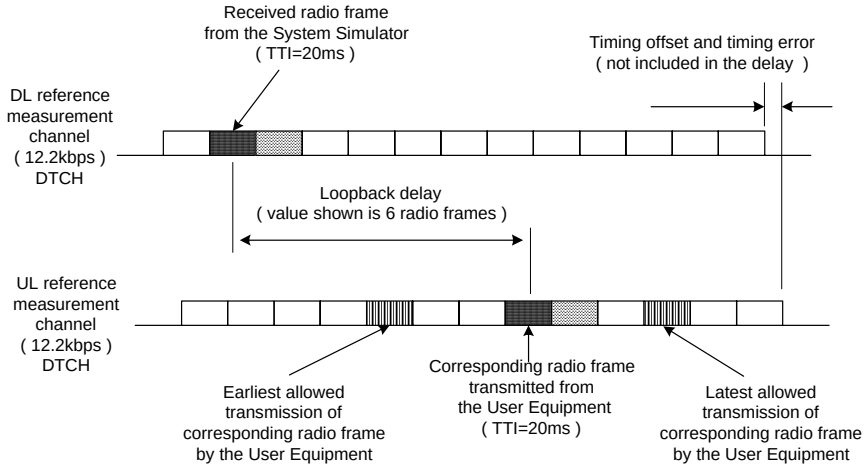


Figure 5.3.2.9.1: Loopback delay requirement

5.3.3 Open UE test loop

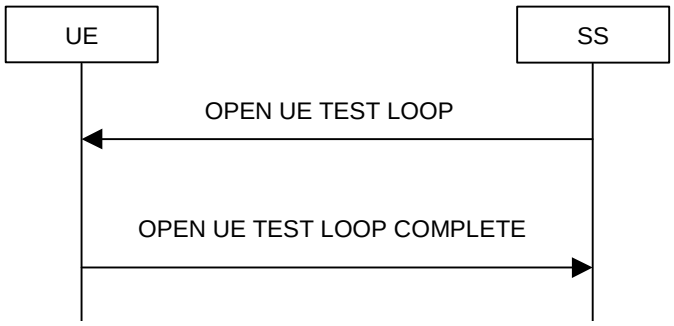


Figure 5.3.3.1: Open UE test loop procedure

5.3.3.1 General

The SS uses the procedure open UE test loop to deactivate the UE test loop fu~~c~~nction 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_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.

Annex A (informative):
UE test loop use scenarios

A.1 Measurement of receiver characteristics (BER) using UE test loop mode 1 and RLC TM

SS can use the UE test loop mode 1 and RLC TM for measuring BER. For UE to be able to return all data it receives form SS it is required that the DL and UL transport block size are the same. It is also required that the UL RLC SDU size parameter of the CLOSE UE TEST LOOP message is set to the same value as the DL and UL transport block size.

A.1.1 Measurement of receiver characteristics (BER) - DL reference measurement channel (12,2 kbps)

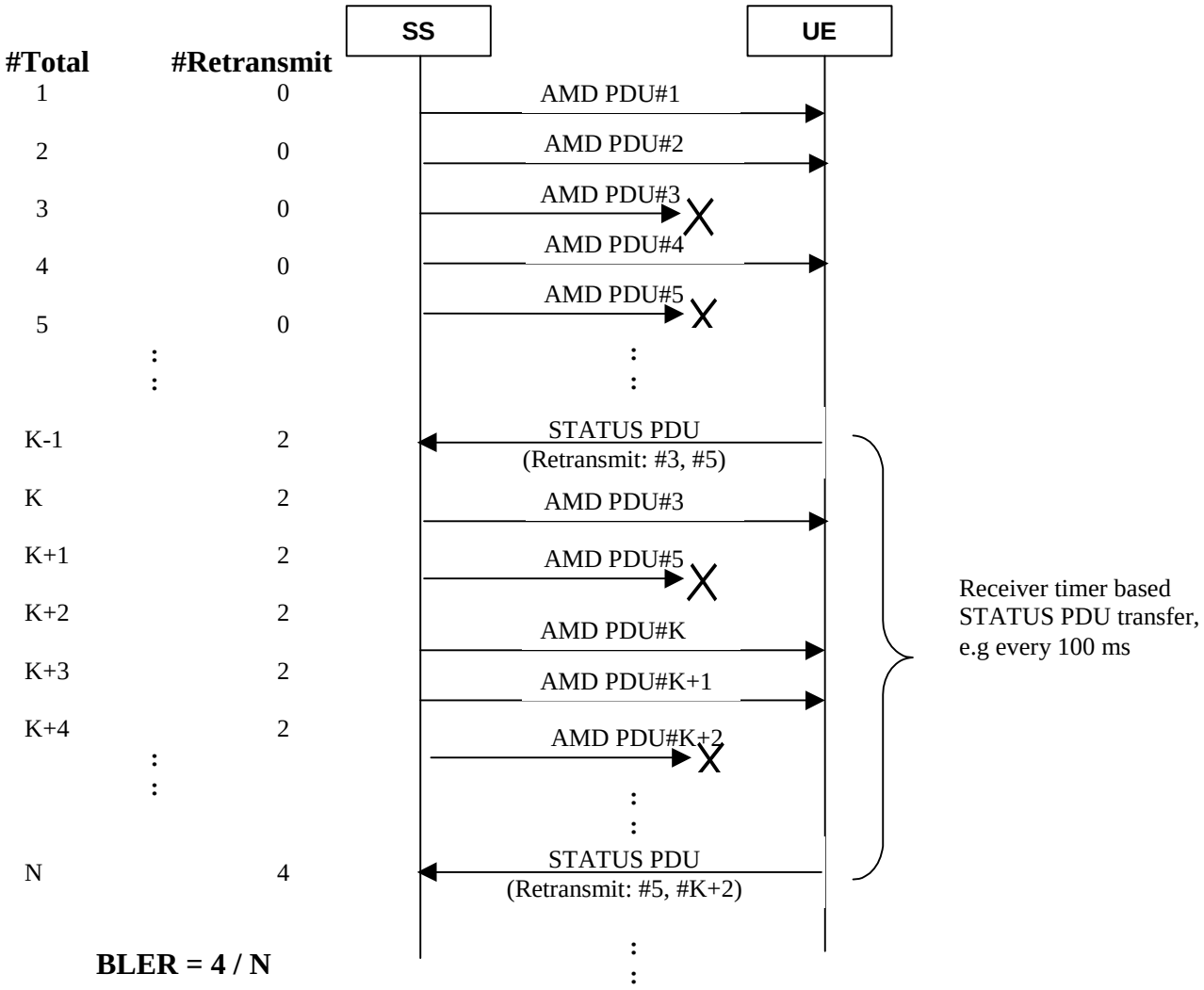
In FDD mode, ~~F~~for measuring BER for the DL and UL reference measurement channel 12.2 kbps according to TS 34.121 Annex ~~A~~C the configuration should be:

- DL and UL transport block size = 244 bits (RLC TM)
- UE test loop mode 1 parameter UL RLC SDU size = 244 bits

In TDD mode, for measuring BER for the DL and UL reference measurement channnel 12.2 kbps according to TS 34.122 Annex C.

A.2 Measurement of receiver performance (BLER) using UE test loop mode 1 and RLC AM

To measure BLER UE test loop mode 1 can be used by having the DL RLC protocol operating in acknowledged mode (AM). The SS can calculate BLER from the ratio of number of UE retransmission requests and the total number of blocks sent by the SS.
In AM the UE indicates missing protocol units (=transport blocks) in the STATUS PDU message. There are different triggers for sending the STATUS PDU message. For the purpose of SS BLER measurement a timer based trigger such as receiver timer based STATUS PDU transfer can be used (see TS 25.322 clause 9.7.2). The figure below illustrates the SS BLER measurement procedure. In the example in the figure block errors are detected by the UE of a total of N blocks. The BLER calculated by the SS is 4 / N.



#Total = Number of sent blocks,
#Retransmit = Number of UE retransmission requests

Figure A.2.3 Measuring BLER using UE test loop mode 1 and DL RLC AM

A.2.1 Measurement of receiver performance (BLER) - DL reference measurement channel (64,144,384 kbps)

By having downlink transport block size set to size of user data part according to the 64, 144 or 384 kbps reference measurement channels and using RLC acknowledge mode the UE test loop mode 1 can be used to measure BLER.

A.3 Measurement of receiver performance (BLER) using UE test loop mode 2

In addition to the method described in A.2 UE test loop mode 2 can be used to measure BLER if the UL transport block size is bigger or equal to the sum of DL transport block size and number of DL CRC bits.
The SS can calculate BLER by checking returned data and CRC and count number of block errors and the total number of sent blocks.

A.3.1 Measurement of receiver performance (BLER) - DL reference measurement channel (12,2 kbps)

[3] TS 25.101 A.2.1 and ~~A.2.2~~A.3.1 defines the DL and UL reference measurement channel 12,2 kbps for FDD mode.

[4] TS 25.102 A.2.1 and A.2.2 defines the DL and UL reference measurement channel 12.2 kbps for TDD mode.

To be able to measure BLER using UE test loop mode 2 the SS needs to configure the uplink transport block size to 260 bits to fit downlink transport block size (244 bits) and downlink CRC bits (16 bits).

A.3.2 Measurement of receiver performance (BLER) - DL reference measurement channel (64,144 and 384 kbps)

[3] TS 25.101 ~~A.2.1 and A.2.2~~A.2 defines the DL and UL reference measurement channel for 64, 144 and 384 kbps for FDD mode.
[4] TS 25.102 A.2 defines the DL reference measurement channel for 64, 144 and 384 kbps for TDD mode.

If an UE supports downlink reference measurement channels for 64,144 or 384 kbps and also the correspondent uplink reference measurement channel then it is possible to use UE test loop mode 2 for measuring BLER for these reference measurement channels.

A.4 Measurement of transmitter characteristics

The SS setups the radio bearer for DL and UL reference measurement channels 12,2 kbps using the generic setup procedure.

See [10] TS 34.108, clause [TBD] for specification of the generic call setup procedure.

See [3] TS 25.101 A.2.1 and ~~A.2.2~~A.3.1 for definition of the DL and UL reference measurement channel 12,2 kbps for FDD mode.

See [4] TS 25.102 A.2.1 and A.2.2 for definition of the DL and UL reference measurement channel 12.2 kbps for TDD mode.

The SS orders the UE to close its UE test loop by transmitting a CLOSE UE TEST LOOP CMD message.
When the SS receives the CLOSE UE TEST LOOP COMPLETE message from the UE the SS starts transmission of data to the UE.
Perform the transmitter test.
The SS sends the OPEN UE TEST LOOP message to the UE to open the UE test loop.

A.5 Measurement of transmitter DTX characteristics

The SS requests the UE to enable DTX and setups the radio bearer for DL and UL reference measurement channels 12,2 kbps using the generic setup procedure.

See [10] TS 34.108, clause [TBD] for specification of the generic setup procedure.

See [3] TS 25.101 A.2.1 and ~~A.2.2~~A.3.1 for definition of the DL and UL reference measurement channel 12,2 kbps for FDD mode.

See [4] TS 25.102 A.2.1 and A.2.2 for definition of the DL and UL reference measurement channel 12.2 kbps for TDD mode.

The SS orders the UE to close its UE test loop using UE test mode 1 by transmitting a CLOSE UE TEST LOOP message.
The UE confirms that the UE test loop is closed by sending the CLOSE UE TEST LOOP COMPLETE message to the SS.
Perform the transmitter DTX testing.
The SS sends the OPEN UE TEST LOOP message to the UE to open the UE test loop.

TSG-T WG1 meeting #8
Naantali, Finland, 31st Aug- 1st Sep, 2000

***Document* T1-000154**
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	004	Current Version:	3.0.0

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

For submission to:	T#9	for approval	X	strategic		(for SMG use only)
List expected approval meeting # here ↑		for information		non-strategic		

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

Source: T1/RF **Date:** 2000-08-31

Subject: UE test loop mode 1, loopback of PDCP SDUs

Work item:

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

F	Correction		**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	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Currently there exist functions in the UE test loop mode 1 to be able to override normal PDCP header compression configuration. No PDCP test cases have been identified which requires such functionality. As no justification exists for any special PDCP behaviour for the case when the UE test loop mode 1 is active such functionality should be removed from TS 34.109.

Clauses affected: 5.3.2.6.1 and 6.2

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:

help.doc

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

<START OF MODIFIED SECTION>

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~~user data block~~ 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.

~~If uplink header compression control bit P1 of the "LB Setup RAB subflow#k" parameter associated with the actual radio bearer is set to "1" then uplink header compression shall be disabled independent on the actual configuration of PDCP. If P1=0 then uplink header compression shall be applied according to the PDCP configuration defined in the radio bearer setup. See 6.2 for description of the P1 control bit.~~

~~If downlink header compression control bit P2 of the "LB Setup RAB subflow#k" parameter associated with the actual radio bearer is set to "1" then downlink header compression shall be disabled independent on the actual configuration of PDCP. If P2=0 then downlink header compression shall be applied according to the PDCP configuration defined in the radio bearer setup. See 6.2 for description of the P2 control bit.~~

~~If no "LB Setup RAB subflow#k" parameter is associated with the actual radio bearer then the uplink and downlink header compression shall be applied according to the PDCP configuration defined in the radio bearer setup.~~

The PDCP loopback operation is illustrated in figure 5.3.2.6.1.1.

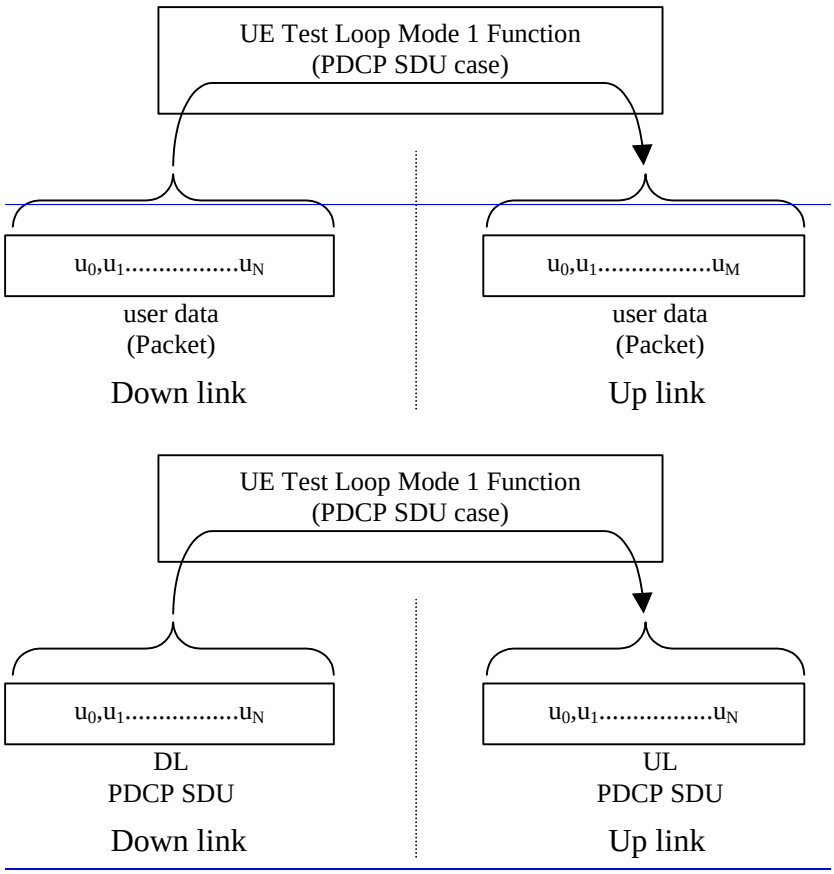


Figure 5.3.2.6.1.1: Loop back of PDCP SDU

<END OF MODIFIED SECTION>

<START OF MODIFIED SECTION>

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

where LB Setup RAB subflow#k is:

8	7	6	5	4	3	2	1	bit no.
0~~P2~~	0~~P1~~	Z13	Z12	Z11	Z10	Z9	Z8	octet 1
Z7	Z6	Z5	Z4	Z3	Z2	Z1	Z0	octet 2
Reserved								octet 3

~~P1 =0 then uplink PDCP header compression shall be performed according to the actual radio bearer configuration, see Note 1~~

~~P1=1 then uplink PDCP header compression shall be disabled, see Note 1~~

~~P2=0 then downlink PDCP header compression shall be performed according to the actual radio bearer configuration, see Note 1~~

~~P2=1 then downlink PDCP header compression shall be disabled, see Note 1~~

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~~2~~

~~NOTE 1 P1 and P2 are only valid for UE test loop mode 1 and for RAB subflows using PDCP protocol layer, see 5.3.2.6.1.~~

NOTE 1~~2~~ The parameter UL RLC SDU size is only applicable for UE test loop mode 1 and for RAB subflows not using PDCP protocol layer, see 5.3.2.6.2.

<END OF MODIFIED SECTION>