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24-25 February 2000

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Agenda Item:

Source:	**TSG T WG1**
To:	**TSG RAN WG1, TSG RAN WG2**
Title:	**Clarification of UE behaviour on CRC error detection when UE operating in RLC transparent or unacknowledged mode.**
Document for:	**Decision**
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TSG T WG1 asks TSG RAN WG1 and TSG RAN WG2 to respond to the issues raised in the present liaison statement before 3 April 2000.

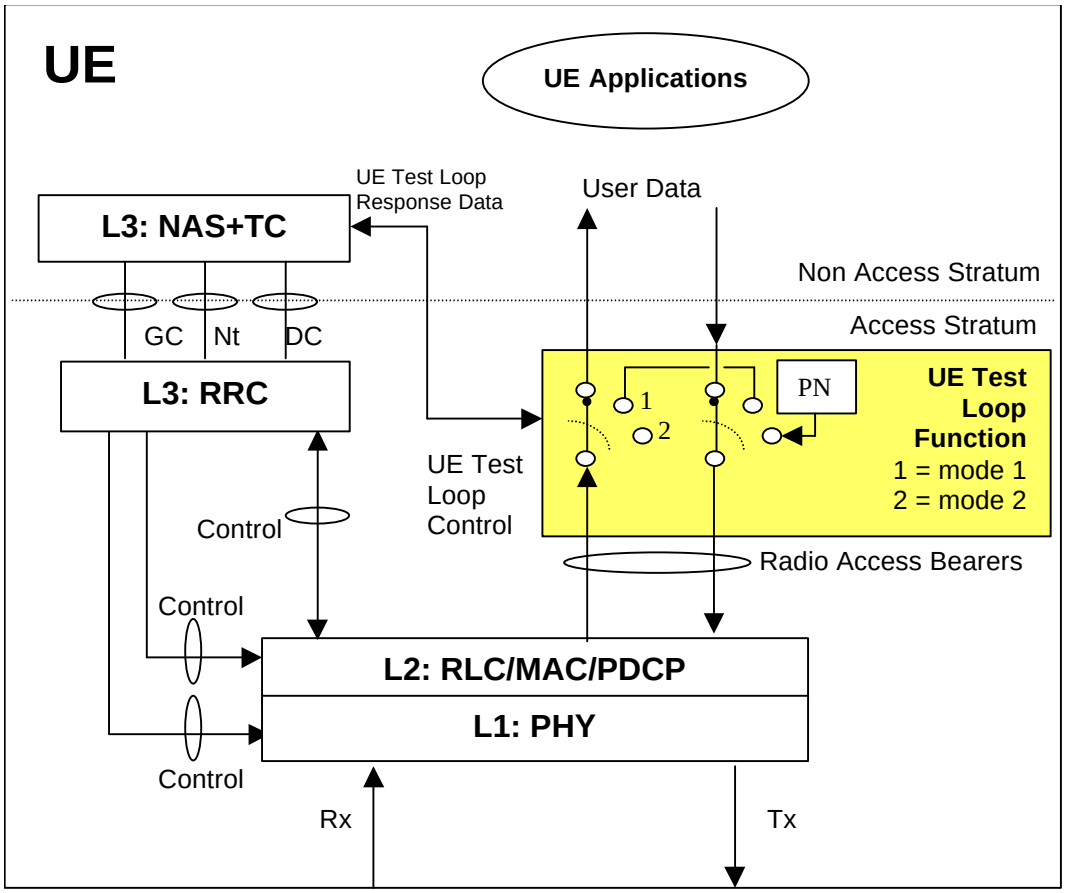
For conformance testing TSG T1 have defined a test loop. The test loop is specified in TS 34.109. To obtain a generic test loop the loop back point of the test loop have been defined above Layer 2, see picture.

For some test scenarios the test loop will be configured to obtain a virtual loop back point of the transport blocks above Layer 1, i.e. the MAC and RLC layers is operated in transparent mode. This configuration is used in the receiver tests to enable System Simulator (test equipment) to measure the UE Bit Error Ratio (BER). The System Simulator measures BER by bit-by-bit comparison of transmitted and received bit pattern to/from the UE.

For the operation of the test loop it is essential that Layer 1 does not discard any transport blocks due to CRC error detection. In the current core specification it is not defined what the UE shall do when detecting CRC error, i.e. if data shall be forwarded to Layer 2 or being discarded.

TSG T WG1 would like to ask TSG RAN WG2 to include requirement in the appropriate specifications that the UE, when operating in RLC transparent or unacknowledged mode shall not discard any received transport block in case of CRC error. I.e. the transport block shall be forwarded to MAC/RLC independent of CRC status.

TSG T WG1 would also like to have RAN WG1 and RAN WG2 opinion if there are other protocol functions (convolution coding?, turbo coding?) that could cause data to being discarded instead of being forwarded.


UE
UE Applications
UE Test Loop
Response Data
User Data
L3: NAS+TC
Non Access Stratum
Access Stratum
GC
Nt
DC
L3: RRC
PN
1
2
UE Test
Loop
Control
UE Test
Loop
Function
1 = mode 1
2 = mode 2
Control
Radio Access Bearers
Control
L2: RLC/MAC/PDCP
L1: PHY
Control
Rx
Tx

3G TS 34.109 V1.2.0 (2000-02)

Technical Specification

3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Terminal Terminal Logical Test Interface; Special conformance testing functions (3G TS 34.109 version 1.2.0)

The present document has been developed within the 3rd Generation Partnership Project (3GPP ™) and may be further elaborated for the purposes of 3GPP.
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Foreword

This Technical Specification has been produced by the 3GPP.
The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the specification;

1 Scope

The present document specifies for User Equipment (UE), for 3rd Generation WCDMA system, those ME 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 or no USIM is present, but shall not function with any other (e.g. network) USIM present except where otherwise stated within the present specification. Any USIM related features such as subsidy-related UE features should also not interfere with the fucntions. In the loopback state, the UE shall be able to perform all functions specified in the present TS except where otherwise stated; in addition however, the special 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 TS applies to the unit that includes the hardware to establish a connection across the radio interface.
In the present document, only loopback with single DCH for DTCH channel (=code) is specified. Test loops for multiple channels (=codes) are not standardized.

2 References

The following documents contain provisions, which through reference in this text constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] TS 24.007 “Mobile radio interface signalling layer 3; General aspects”

[2] TS 24.008 “Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification”

[3] TS 25.101 “UE Radio transmission and reception (FDD)”

[4] TS 25.102 “UE Radio transmission and reception (TDD)”

[5] TS 25.331 “Radio Resource Control; Protocol Specification”

[6] TR 21.905 “3G Vocabulary”

[7] TS 31.101 “UICC Physical and Logical Characteristics”

[8] TS 34.121 “Terminal Conformance Specification; Radio transmission and reception (FDD)”

[9] TS 34.122 “Terminal Conformance Specification; Radio transmission and reception (TDD)”

[10] TS 34.108 “Reference test environment”

[11] TS 25.211 “Physical channels and mapping of transport channels onto physical channels (FDD)”

[12] TS 25.133 “Requirements for support of RRM (FDD)”

[13] GSM 04.14 “Individual equipment type requirements and interworking; Special conformance testing functions”

3 Definitions, symbols and abbreviations

3.1 Abbreviations

Abbreviation used in the present TS are listed in [6] TR 21.905.
For the purposes of the present document, the following additional abbreviations apply:

SAPI	Service Access Point Indicator
SS	System Simulator
TC	Test Control
UICC	UMTS Integrated Circuit Card

3.2 Symbols

For the purposes of the present document, the following symbols apply:
None

3.3 Definitions

For the purposes of the present document, the following definitions apply:

UE (User Equipment)	User equipment that is under test.
SS (System Simulator)	Test system (or equipment) which drives the test process between UE, like BS (Base Station) simulator.
User	Test user, who handles the test and measurement process via the logical test interface
Logical Test Interface	Interface which provides the logical service to interwork and to communicate between UE and System Simulator during the test of a UE.
Logical service	Logical service is composed of message set (Set/Get/Action), which works upon test object from System Simulator to UE.
Test Object	Each test condition and item is defined as a test object logically.
TC (Test Control)	UE protocol entity used by the SS to control the UE specific testing functions.

3.4 Mobile station definition and configurations

UE definition and configurations is specified in [TBD].

4 Activation and deactivation of special test functions in the UE

4.1 General description

The SS performs activation and deactivation of the special test functions in the UE by sending standard 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 UE test command messages is the same as used in GSM for the MS specific testing functions, see [13] GSM 04.14.

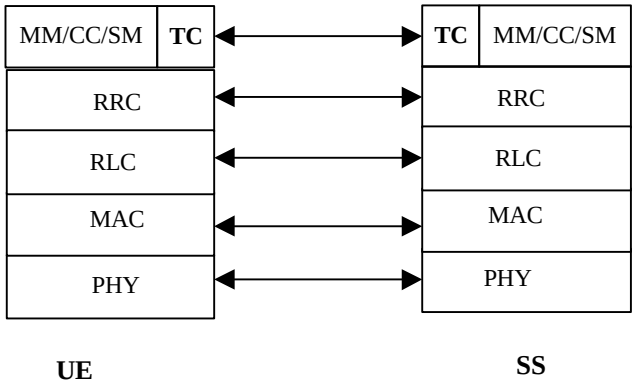

Figure 4.1.1 Termination of UE test command messages (TC =Test Control).

See clause 7 for definition of the layer 3 messages.
Apart from sending the appropriate deactivation command to the UE the functions can be deactivated by switching off the UE.
The following UE special testing functions can be activated (and deactivated):

- UE test loop function
- Power closed loop control enable/disable

[Editor's note: It has not yet been decided if the EMMI and DAI interface is to be specified for 3G terminals. If the DAI interface is to be used then the following statement needs to be stated: "The TCH loops and the test via DAI are test functions, which are mutually exclusive".]

4.2 UE test loop

The UE test loop function is specified in clause 6.2.
The SS can control the UE test loop function by sending the following Layer 3 messages to the UE:

- CLOSE_UE_TEST_LOOP_CMD
- OPEN_UE_TEST_LOOP_CMD

The UE confirms closing and opening of the FDD DTCH test loop by sending the following Layer 3 messages to the SS:

- CLOSE_UE_TEST_LOOP_ACK
- OPEN_UE_TEST_LOOP_ACK

See clause 7 for specification of the messages.

4.3 Closed loop power control - enable/disable

The SS can enable/disable the closed loop power control by sending the following Layer 3 commands to the UE:

- ENABLE_CLOSED_LOOP_PWR_CTRL_CMD
- DISABLE_CLOSED_LOOP_PWR_CTRL_CMD

The UE confirms that closed loop power control loop has been enabled/disabled by sending the following Layer 3 messages to the SS:

- ENABLE_CLOSED_LOOP_PWR_CTRL_ACK
- DISABLE_CLOSED_LOOP_PWR_CTRL_ACK

See clause 7 for specification of message content.

5 Retrieving of UE status data

5.1 General description

The UE status data can be set and retrieved by SS by sending appropriate Layer 3 commands to the UE. See clause 7 for definition of the Layer 3 commands.

- Currently no UE status data need to be retrieved using the logical test interface.

6 Internal test loops

[Editor's note: Test loops for TDD is FFS]

6.1 General description

An UE test loop function is required providing access to isolated functions of the UE without introducing new physical interfaces just for the reason of conformance testing. Figure 6.1.1 shows a functional block diagram of a reference UE containing the UE test loop function.

NOTE: 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 Layer 3 command message to the UE, see clause 4.

The loop back point has been selected above Layer 2 (radio bearers) 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.

The UE test loop function can be operated in two different modes. In UE test mode 1 received data is looped back according to procedure specified in clause 6.2.3.2. In UE test mode 2 an internal pseudo random sequence generator is used for transmitting in uplink, see clause 6.2.3.3.

NOTE: While the UE test loop function is active no UE applications should interfere with the established RRC connection or the UE test loop function. This may be achieved by the UE automatically disable relevant UE applications when the UE test loop function is activated or by manually disable such UE applications. An example of a UE application that potentially could cause interference to UE test loop function is an e-mail application that automatically connects to an e-mail server at certain intervals.

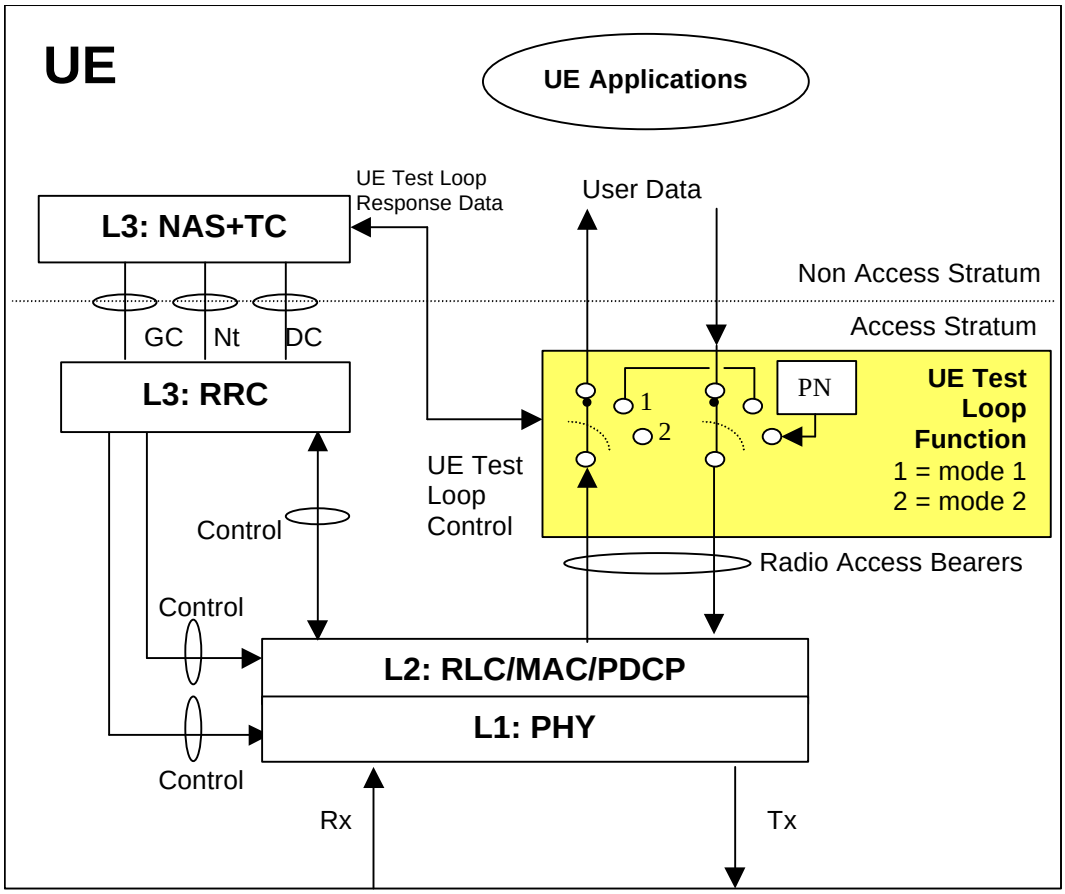

Figure 6.1.1 UE test loop function (TC =Test Control).

6.2 UE test loop function

6.2.1 Purpose

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 DTCH UL/DL symmetric user bit-rates. The reference measurement channels as specified in [3] TS 25.101 annex A are achieved by transparent configuring of the RLC and MAC layers.
- Testing of receiver performance based on BLER (BLock Error Ratio) measurement. The SS calculates BLER based on the [ACK/NACK] messages received from the UE operating in RLC acknowledged mode.
- Testing of UE transmitter characteristics.
- Testing of UE transmitter DTX characteristics.
- Testing of radio bearers (UE test loop function emulates terminal equipment)

6.2.2 Applicability

The UE test loop function is applicable to all UE.

6.2.3 Generic Procedure

6.2.3.1 Procedure

Any UE applications that could interfere with the UE test loop function should be disabled.
The control sequence for the UE test loop function is illustrated in figure 6.2.3.
The SS setups the radio bearer using the generic setup procedure. See [10] TS 34.108, [clause TBD] for specification of the generic setup procedure.
The SS orders the UE to close its radio bearer test loop by transmitting a CLOSE_UE_TEST _LOOP_CMD message.
The SS then starts timer TT01.

If no radio bearer is active, the UE shall ignore any CLOSE_UE_TEST_LOOP_CMD message.
If a radio bearer is active, the UE shall close the test loop and then send back to the SS a CLOSE_UE_TEST_LOOP_ACK message. The loopback should be operational prior to the sending of the acknowledge. Upon reception of this message the SS stops timer TT01.
If the test loop is already closed, the UE shall still respond as if the loop had been open, i.e the CLOSE_UE_LOOP_ACK message should be sent prior to TT01 expiring.
If UE test mode 1 have been selected then the loop back scheme according to 6.2.3.2 shall be performed by the UE.
If UE test mode 2 have been selected then the loop back scheme according to 6.2.3.3 shall be performed by the UE.
The UE shall provide for normal 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 should be maintained across handovers, but after bearer disconnection, the loopback ceases to exist.
The UE shall not discard any transport blocks in case CRC error is detected while the UE test loop function is active.
If DTX is enabled and no data is to be transmitted (i.e. no data is received while the DTCH loop is closed) then the UE shall switch off the UL DPDCH and only transmit the DPCCH.
The SS orders the UE to open its radio bearer test loop by transmitting a OPEN_UE_TEST _LOOP_CMD message. The SS then starts timer TT01.
If no radio bearer is active, the UE shall ignore any OPEN_UE_TEST_LOOP_CMD message.
If a radio bearer is active, the UE shall open the test loop and send back to the SS a OPEN_UE_TEST_LOOP_ACK message. Upon reception of this message the SS stops timer TT01.
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.

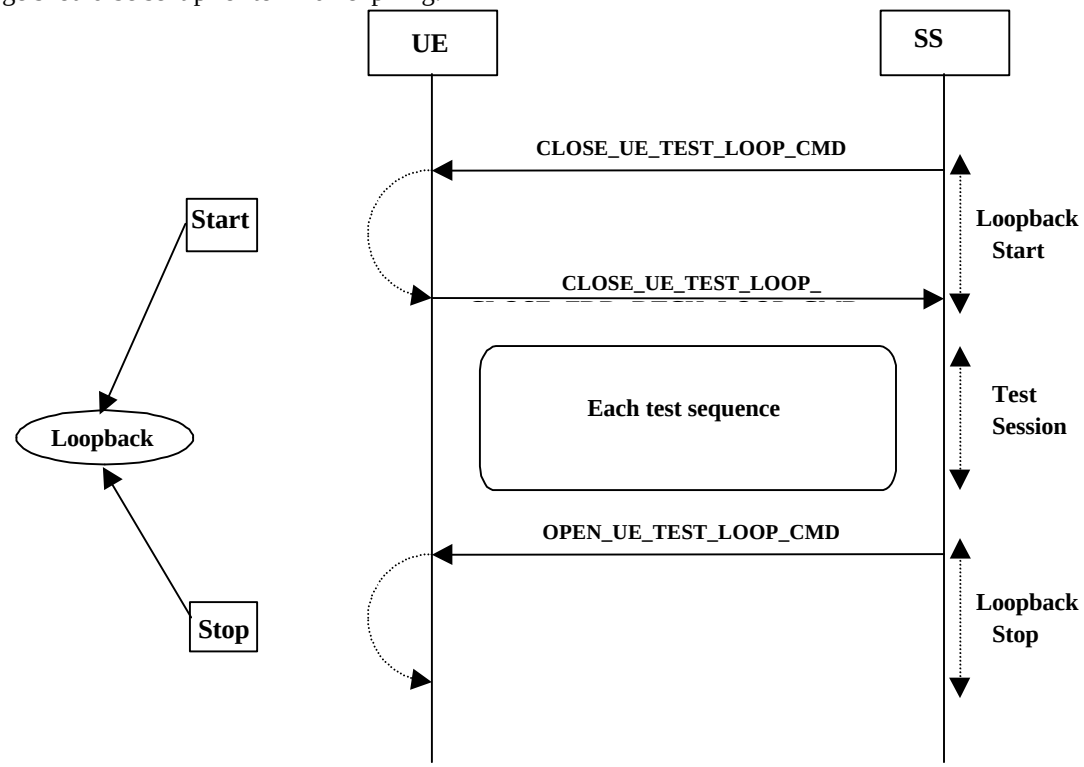

Figure 6.2.3: UE test loop control

6.2.3.2 UE test mode 1 loop back scheme (loop back DL data on UL)

If UE test mode 1 have been selected 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 or PDCP service access point (SAP) and be input to the correspondent RLC or PDCP SAP and transmitted (uplink).
If the downlink (DL) user bit-rate is higher than the uplink (UL) user bit-rate then the UE shall return the first N bits of the received block, where N is the UL block size.
If the UL user bit-rate is higher than the DL user bit-rate then the UE shall fill the UL send block by repeating the received data block until the UL send block has been filled (truncating the last block if necessary).

6.2.3.3 UE test mode 2 loop back scheme (transmit PN sequence)

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 its radio bearer test loop data for input to the RLC or PDCP SAP shall be generated using any binary pseudo random sequence generator with a cycle of 32,767 bits or greater (for example CCITT defined PN15, PN22 etc.).
Example test patterns may be found in CCITT recommendation O.153 Fascicle IV.4, (Basic parameters for the measurement of error performance at bit rates below the primary rate, Melbourne 1988) clause 2.1.

[Editor's note: "any binary pseudo random sequence ..." is how GSM 04.14 specifies use of Pseudo Random Sequence generator. It has to be decided if a specific PN sequence generator shall be used for 3G, such as PN15 or if this is up to the manufacturer to select. The definition of test signal (PN sequence) should be defined in TS 34.108 and referenced from present clause.]

[Editor's note: It needs to de decided what should trigger UE to transmit data blocks in packet mode, i.e. if data blocks should be sent as fast as possible; or data blocks should be sent at regular intervals; or triggered by SS (by signalling message) ?]

6.2.4 Loopback delay requirement

Loopback delay requirements are categorized into two cases.

- UE receiver/transmitter characteristics measurement case

  In this case, the UE sends back the data it receives with the same user bit-rate as downlink DTCH.

- UE receiver performance measurement case

  In this case, the UE sends back [ACK/NACK] message for BLER measurement.

[Editor's note: Any time delay requirement in clause 6.2.4 need to be justified. Is there really a need to specify time delay requirement for the BLER case? Are there other RF tests except DTX test that require defined loopback delay?]

6.2.4.1 UE receiver/transmitter characteristics measurement case

Requirements in this section are applicable to testing of UE receiver characteristics based on BER measurement and testing of UE transmitter characteristics. The DL and UL reference measurement channel (12.2kbps) are used for these tests.

[Editor's note: Applicability to testing of UE transmitter DTX characteristics is FFS.]

[Editor's note: Reference to the radio bearer configuration used for the DL and UL reference measurement channel 12.2 kbps to be added as radio bearer configuration parameters such as transmission time interval (TTI) will have impact on the delay of the loopback mechanism. This radio bearer configuration will be specified in TS 34.108]

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, the UE shall maintain a fixed loopback delay (the loopback delay shall not vary during a test). The loopback delay shall not be less than 3 radio frames and shall not exceed [FFS] radio frames.

[Editor's note: What is the justification for having the requirement "shall not be less than 3 radio frames"? isn't enough to specify a maximum delay.]

The loopback delay requirements for UE receiver/transmitter characteristics measurement case are illustrated in figure 6.2.4.1.

See [3] TS 25.101 A.2.1 and A.2.2 for definition of the DL and UL reference measurement channel (12.2kbps).

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.

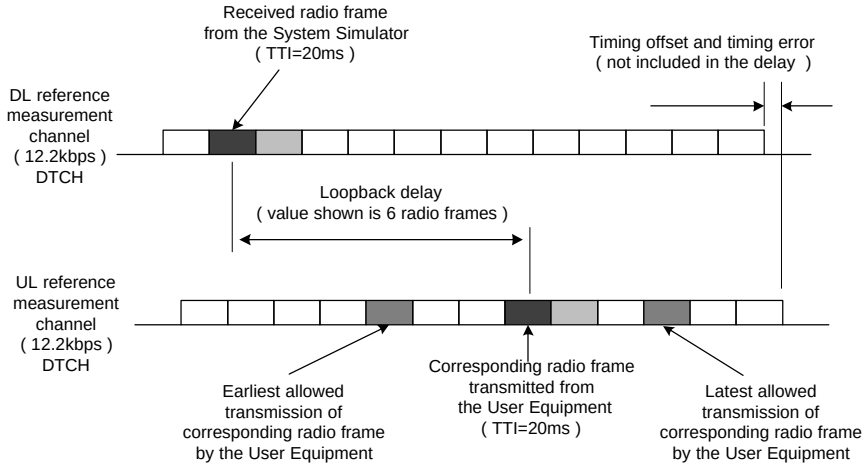

Figure 6.2.4.1: Loopback delay requirement (UE receiver/transmitter characteristics measurement case)

6.2.4.2 UE receiver performance measurement case

Requirements in this section are applicable to testing of UE receiver performance based on BLER measurement.

[TBD]

6.2.5 UE test loop use scenarios

NOTE 1: The use scenarios do not include all details regarding the UE test loop function. The detailed operation of the UE and SS shall be according to the generic procedure as specified in 6.2.3.

6.2.5.1 Measurement of receiver characteristics (BER) – DL reference measurement channel (12.2kbps)

The SS setups the radio bearer for DL and UL reference measurement channels 12.2kbps 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 for definition of the DL and UL reference measurement channel 12.2kbps.

The SS orders the UE to close its UE test loop using UE test mode 1 by transmitting a CLOSE_ UE_TEST_LOOP_CMD message.
When the SS receives the CLOSE_ UE_TEST_LOOP_ACK message from the UE the SS starts the transmission of data to the UE.
The SS compares the received and sent data bit-by-bit to calculate the bit error ratio, BER.
The SS sends the OPEN_ UE_TEST_LOOP message to the UE to open the UE test loop.

6.2.5.2 Measurement of receiver performance (BLER) – DL reference measurement channel (12.2kbps)

The SS setups the radio access bearer for DL and UL reference measurement channels 12.2kbps using the generic setup procedure with the RLC information element of the RADIO_ACCESS_BEARER_SETUP message set according to table 6.3.5.2.

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 for definition of the DL and UL reference measurement channel 12.2kbps.

Table 6.2.5.2: RLC info element (DL reference measurement channel 12.2kbps)

Parameters	Value	Notes
UL RLC mode	[TBD]	
UL RLC in-sequence delivery	[TBD]	
UL RLC PDU Size	[TBD]	
UL RLC transmission window size	[TBD]	
UL RLC retransmission info	[TBD]	
DL RLC mode	[RLS acknowledged mode]	
DL RLC in-sequence delivery	[TBD]	
DL RLC PDU size	[244 Bits]	The RLC PDU size shall be the same length as defined for DL reference measurement channel 12.2 kbps, see [3] TS 25.101 A.2.2
DL RLC transmission window size	[TBD]	
DL RLC retransmission info	[TBD]	

The SS orders the UE to close its UE test loop using UE test mode 1 by transmitting a CLOSE_ UE_TEST_LOOP_CMD message.
When the SS receives the CLOSE_UE_TEST_LOOP_ACK message from the UE the SS starts the transmission of data to the UE.
The SS counts the number of transmitted blocks (Ntot) and the number of retransmission requests (Nerr) received by the UE.
The SS calculates block error ratio, BLER as the ratio between the number of retransmission requests and the total number of transmitted blocks (Nerr/Ntot).
The SS sends the OPEN_ UE_TEST_LOOP message to the UE to open the UE test loop.

6.2.5.3 Measurement of receiver performance (BLER) – DL reference measurement channel (64kbps)

The SS setups the radio bearer for DL reference measurement channel 64kbps and UL reference measurement channel 12.2kbps using the generic setup procedure with the RLC information element of the RADIO_ACCESS_BEARER_SETUP message set according to table 6.3.4.3.

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

See [3] TS 25.101 A.2.1 for definition of the UL reference measurement channel 12.2kbps.

See [3] TS 25.101 A.2.3 for definition of the DL reference measurement channel 64kbps.

Table 6.2.5.3: RLC info element (DL reference measurement channel 64kbps)

Parameters	Value	Notes
UL RLC mode	[TBD]	
UL RLC in-sequence delivery	[TBD]	
UL RLC PDU Size	[TBD]	
UL RLC transmission window size	[TBD]	
UL RLC retransmission info	[TBD]	
DL RLC mode	[RLS acknowledged mode]	
DL RLC in-sequence delivery	[TBD]	
DL RLC PDU size	[1080 Bits]	The RLC PDU size shall be the same length as defined for DL reference measurement channel 64kbps, see [3] TS 25.101 A.2.3
DL RLC transmission window size	[TBD]	
DL RLC retransmission info	[TBD]	

Perform the procedure as described in 6.3.5.2

6.2.5.4 Measurement of receiver performance (BLER) – DL reference measurement channel (144kbps)

The SS setups the radio bearer for DL reference measurement channel 144kbps and UL reference measurement channel 12.2kbps using the generic setup procedure with the RLC information element of the RADIO_ACCESS_BEARER_SETUP message set according to table 6.3.5.4.

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

See [3] TS 25.101 A.2.1 for definition of the UL reference measurement channel 12.2kbps.

See [3] TS 25.101 A.2.4 for definition of the DL reference measurement channel 144kbps.

Table 6.2.5.4: RLC info element (DL reference measurement channel 144kbps)

Parameters	Value	Notes
UL RLC mode	[TBD]	
UL RLC in-sequence delivery	[TBD]	
UL RLC PDU Size	[TBD]	
UL RLC transmission window size	[TBD]	
UL RLC retransmission info	[TBD]	
DL RLC mode	[RLS acknowledged mode]	
DL RLC in-sequence delivery	[TBD]	
DL RLC PDU size	[2880 Bits]	The RLC PDU size shall be the same length as defined for DL reference measurement channel 144kbps, see [3] TS 25.101 A.2.4
DL RLC transmission window size	[TBD]	
DL RLC retransmission info	[TBD]	

Perform the procedure as described in 6.3.5.2

6.2.5.5 Measurement of receiver performance (BLER) – DL reference measurement channel (384kbps)

The SS setups the radio bearer for DL reference measurement channel 384kbps and UL reference measurement channel 12.2kbps using the generic setup procedure with the RLC information element of the RADIO_ACCESS_BEARER_SETUP message set according to table 6.3.5.5.

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

See [3] TS 25.101 A.2.1 for definition of the UL reference measurement channel 12.2kbps.

See [3] TS 25.101 A.2.5 for definition of the DL reference measurement channel 384kbps.

Table 6.2.5.5: RLC info element (DL reference measurement channel 384kbps)

Parameters	Value	Notes
UL RLC mode	[TBD]	
UL RLC in-sequence delivery	[TBD]	
UL RLC PDU Size	[TBD]	
UL RLC transmission window size	[TBD]	
UL RLC retransmission info	[TBD]	
DL RLC mode	[RLS acknowledged mode]	
DL RLC in-sequence delivery	[TBD]	
DL RLC PDU size	[7680 Bits]	The RLC PDU size shall be the same length as defined for DL reference measurement channel 384kbps, see [3] TS 25.101 A.2.5
DL RLC transmission window size	[TBD]	
DL RLC retransmission info	[TBD]	

Perform the procedure as described in 6.3.5.2

6.2.5.6 Measurement of transmitter characteristics

The SS setups the radio bearer for DL and UL reference measurement channels 12.2kbps 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 for definition of the DL and UL reference measurement channel 12.2kbps.

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_ACK 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.

6.2.5.7 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 12.2kbps 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 for definition of the DL and UL reference measurement channel 12.2kbps.

The SS orders the UE to close its UE test loop using UE test mode 1 by transmitting a CLOSE_ UE_TEST_LOOP_CMD message.
The UE confirms that the UE test loop is closed by sending the CLOSE_ UE_TEST_LOOP_ACK 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.

7 Message definitions and contents

In this clause, only Layer 3 protocol messages are described. Underlying protocols are described in clause 9.

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.

7.1 Timer values

TT01: To be started when a CLOSE_UE_TEST_LOOP_CMD or OPEN_UE_TEST_LOOP_CMD is sent. To be stopped when the corresponding CLOSE_UE_TEST_LOOP_ACK or OPEN_UE_TEST_LOOP_ACK is received.

If TT01 expires, then this shall be indicated to the test case.

Recommended value: [2.5 seconds].

7.2 CLOSE_UE_TEST_LOOP_CMD

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 mode		M	V	1

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 mode is:

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

X1=0 and X2=0 then UE test mode 1 loop back scheme according to 6.2.3.2 shall be performed by the UE .
X1=0 and X2=1 then UE test mode 2 loop back scheme according to 6.2.3.3 shall be performed by the UE (PN sequence).

7.3 CLOSE_ UE_TEST_LOOP_ACK

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	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	0	1	Octet 1

7.4 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
Acknowledge		O	TV	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

7.5 OPEN_UE_TEST_LOOP_ACK

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	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	1	Octet 1

7.6 ENABLE_CLOSED_LOOP_PWR_CTRL_CMD

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	1	0	0	octet 1

7.7 DISABLE_CLOSED_LOOP_PWR_CTRL_CMD

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	1	1	0	octet 1

7.8 ENABLE_CLOSED_LOOP_PWR_CTRL_ACK

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	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	1	0	1	octet 1

7.9 DISABLE_CLOSED_LOOP_PWR_CTRL_ACK

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	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	1	1	1	octet 1

8 Electrical Man Machine Interface (EMMI)

[TBD]

[Editor's Note: In GSM a special interface called Electrical Man Machine Interface (EMMI) is specified to provide for automatically registration of the status, indications and performance of the UE. The EMMI is a half duplex communication link between the SS and the UE. It is also possible to simulate actions normally made by the user on the keyboard of the UE.

In GSM the EMMI is optional to the UE and mandatory to the SS

The need for an EMMI to be part of the UE WCDMA specifications need to be investigated.

]

9 UICC/ME test interface

9.1 General description

A special interface is required in order to perform the tests of the UICC/ME interface.

9.2 Formal aspects

It shall be possible to connect the UICC/USIM simulator to the ME. If an adapter is to be used, the manufacturer of the ME shall provide it.
When using the UICC/USIM simulator, the ME does not necessarily conform to all RF requirements.
When the UICC/USIM simulator is connected the ME shall be able to correctly send and receive on a DTCH and associated channels under ideal radio conditions.

9.3 Hardware and logical aspects of the interface

The signals on this interface are specified in [7] TS 31.101.

9.4 Mechanical characteristics of the interface

The mechanical interface is specified in [7] TS 31.101.

History

Document history		
V0.0.0	1999-02	Initial document. The contents are given from ARIB "Specification of Mobile Station for 3G Mobile System" (Ver.1.0-1.0)
V0.0.1	1999-04	Change requests agreed by TSG-T1 RF/SWG
V0.1.0	1999-04-15	Changes as agreed by TSG-T1 #2 meeting.
V0.2.0	1999-05-27	Changes as agreed by TSG-T1 RF/SWG and TSG-T1 SIG/SWG according to TSG-T1R#4(99)041 & TSG-T1S#2(99)017.
V0.2.1	1999-08-26	Change of document number from iTS-T1.001 to TS 34.109. Scope expanded to cover both FDD and TDD. Same content as v0.2.0.
V0.2.2	1999-08-27	Editorial changes in the format.
V0.3.0	1999-09-16	Changes as agreed by TSG-T1 according to TSG-T1#4(99)109.
V0.3.1	1999-09-28	Editorial changes received by T1 e-mail reflector.
V1.0.0	1999-10-21	Endorsed by TSG-T#5 as TS 34.109 V1.0.0
V1.0.1	1999-11-16	Addition of Postal address and Copyright notification
V1.0.2	1999-12-08	Changes as agreed by TSG T1 RF and SIG SWGs according to TSG-T1R#8(99)117 & TSG-T1S#6(99)058.
V1.0.3	1999-12-09	Changes as agreed by TSG T1 RF and SIG SWGs according to TSG-T1#5(99)163
V1.1.0	2000-01-27	Changes as agreed by TSG T1 RF and SIG SWGs according to TSG-T1S#8(00)0006 & TSG-T1#10(00)0017.
V1.2.0	2000-02-25	Changes as agreed at TSG T1#6

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