

26 Testing of layer 3 functions

Ref.: GSM04.08

NOTE: The tests on functioning of the elementary procedures in the MS are grouped as the description of those procedures in GSM 04.08. However, the test procedures are carried out in an order which is more logic for the purpose of testing.

26.1 Default conditions and structured sequence of tests

26.1.1 Default test conditions during layer 3 tests

During tests in section 26 the following default test conditions shall apply if not otherwise stated within the test description. In the table below, decimal values are normally used. Sometimes a hexadecimal value, indicated with a "H", or a binary value, indicated with a "B" is given.

	GSM900	DCS 1 800
General signalling conditions for all carriers		
Ciphering	yes	yes
General RF-conditions for all carriers		
Frequency hopping mode	Non-hopping	Non-hopping
Propagation profile	Static	Static
Downlink Input Level	63 dB μ Vemf()	63 dB μ Vemf()
Uplink output power	Minimum according to MS power class	Minimum according to MS power class
Serving cell, BCCH/CCCH carrier		
Channel ARFCN	20	590
Alternative channels	40 or 60	690 or 830
Serving cell, Traffic channel, SDCCH		
Channel ARFCN	30	650
Alternative channels	50 or 70	750 or 850
Power Control Indicator	0	0
Neighbouring cells BCCH/CCCH carriers		
Channel ARFCN	10, 80, 90, 100, 110, 120	520, 600, 700, 780, 810, 870
Alternative channels	15, 85, 95, 105, 115, 122	530, 610, 710, 790, 820, 880
Input level	53 dB μ Vemf()	53 dB μ Vemf()
Network dependent parameters		
Cell identity	0001H	0001H
Mobile country code, MCC	001 (decimal)	001 (decimal)
Mobile network code, MNC	01 (decimal)	01 (decimal)
Location area code, LAC	0001H	0001H
Frequency List	Bit Map 0	Range 512
BCCH allocation sequence number(BA_IND)	0	0
Cell Channel Descriptor	Bit Map 0	Range 512
PLMN colour code, NCC	1	1
BS colour code, BCC	5	5
SMS Cell Broadcast	not active	not active
DTX	MS must not use	MS must not use
IMSI Attach-detach	MS shall not apply	MS shall not apply
CCCH_CONF	1 basic physical channel for CCCH combined with SDCCH	1 basic physical channel for CCCH combined with SDCCH
BS_AG_BLKS_RES	0 blocks reserved	0 blocks reserved
BS_PA_MFRMS	5 paging subgroups	5 paging subgroups

	GSM 900	DCS 1 800
CELL_BAR_ACCESS	(not barred)	(not barred)
Call-reestablishment (RE)	(allowed)	(allowed)
Emergency Call allowed	allowed	same
Access Control Class (AC) (0..9, 11..15)	allowed	same
Network dependent timers		
Radio_Link_Time-out	8	8
T3212 Periodic updating in decihours	Infinite	Infinite
Access control parameters		
Max retrans	1	1
Tx-integer, nr. of slots	5	5
CELL_RESELECT_HYSTERESIS	12 dB	12 dB
MS_TXPWR_MAX_CCH	minimum level	minimum level
RXLEV_ACCESS_MIN	minimum	minimum
NECI	New establishment causes are not supported	same
ACS (ADDITIONAL RESELECTION PARAM IND)	No additional cell parameters are present in SI messages 7 and 8	same
P1 and C2 parameters	C2 parameters not present	same
POI and POWER OFFSET	N/A	POWER OFFSET Parameter not present.

	GSM 450	GSM 480
General signalling conditions for all carriers		
Ciphering	yes	yes
General RF-conditions for all carriers		
Frequency hopping mode	Non-hopping	Non-hopping
Propagation profile	Static	Static
Downlink Input Level	63 dB μ Vemf()	63 dB μ Vemf()
Uplink output power	Minimum according to MS power class	Minimum according to MS power class
Serving cell, BCCH/CCCH carrier		
Channel ARFCN	263	310
Alternative channels	274 or 276	321 or 323
Serving cell, Traffic channel, SDCCH		
Channel ARFCN	267	314
Alternative channels	275 or 279	322 or 326
Power Control Indicator	0	0
Neighbouring cells BCCH/CCCH carriers		
Channel ARFCN	260, 281, 284, 287, 290, 293	307, 328, 331, 334, 337, 340
Alternative channels	261, 280, 283, 286, 289, 292	308, 327, 330, 333, 336, 339
Input level	53 dB μ Vemf()	53 dB μ Vemf()
Network dependent parameters		
Cell identity	0001H	0001H
Mobile country code, MCC	001 (decimal)	001 (decimal)
Mobile network code, MNC	01 (decimal)	01 (decimal)
Location area code, LAC	0001H	0001H
Frequency List	Range 128	Range 128
BCCH allocation sequence number(BA_IND)	0	0
Cell Channel Descriptor	Range 128	Range 128
PLMN colour code, NCC	1	1
BS colour code, BCC	5	5
SMS Cell Broadcast DTX	not active	not active
IMSI Attach-detach	MS must not use	MS must not use
CCCH_CONF	MS shall not apply	MS shall not apply
BS_AG_BLKS_RES	1 basic physical channel for CCCH combined with SDCCH	1 basic physical channel for CCCH combined with SDCCH
BS_PA_MFRMS	0 blocks reserved	0 blocks reserved
	5 paging subgroups	5 paging subgroups

	GSM 450	GSM 480
CELL_BAR_ACCESS	(not barred)	(not barred)
Call-reestablishment (RE)	(allowed)	(allowed)
Emergency Call allowed	allowed	same
Access Control Class (AC) (0..9, 11..15)	allowed	same
Network dependent timers		
Radio_Link_Time-out	8	8
T3212 Periodic updating in decihours	Infinite	Infinite
Access control parameters		
Max retrans	1	1
Tx-integer, nr. of slots	5	5
CELL_RESELECT_HYSTERESIS	12 dB	12 dB
MS_TXPWR_MAX_CCH	minimum level	minimum level
RXLEV_ACCESS_MIN	minimum	minimum
NECI	New establishment causes are not supported	same
ACS (ADDITIONAL RESELECTION PARAM IND)	No additional cell parameters are present in SI messages 7 and 8	same
P1 and C2 parameters	C2 parameters not present	same
POI and POWER OFFSET	N/A	POWER OFFSET Parameter not present.

These informations are provided by system information 1, 2, 3 and 4 messages.

The system information elements which are broadcast on the SACCH during the dedicated mode should be consistent with those sent on the BCCH when the MS was in idle mode prior to the channel request.

In addition, all fill paging messages sent on the paging sub-channels will have by default, their page mode set to NORMAL PAGING.

26.1.2 Structured sequence of the tests

The tests shall be performed in the order as indicated in the following table.

The validity of the tests depends upon the results of the tests performed before.

Channel request (basic test)	RR	26.2.1
Immediate assignment	RR	26.6.1
IMSI attach/detach (basic)	RR	26.2.2
Paging	RR	26.6.2
Test of the mobile station functions in idle mode	RR	26.3
Frequency redefinition	RR	26.6.6
Measurement report (incl. system info not idle)	RR	26.6.3
Authentication	MM	26.7.2
Cipher mode setting	RR	26.6.8
Identification	MM	26.7.3
Sequenced MM/CM message transfer	..	26.2.3
Channel release	RR	26.6.12
Location updating	MM	26.7.4
TMSI reallocation	MM	26.7.1
Classmark change	RR	26.6.11
Call control (verification on CC state diagram)	CC	26.8.1.1 and 26.8.1.2
Call rearrangement	CC	26.8.1.4.4
DTMF information transfer	CC	26.8.1.4.1
Handover	RR	26.6.5
Additional assignment	RR	26.6.9
Partial release	RR	26.6.10
Re-establishment	CC	26.8.2
Dedicated channel assignment (during calls)	RR	26.6.4
Transmission mode change	RR	26.6.7
Mobility management connection establishment	MM	26.7.5
Test of Layer 3 error handling		26.5
User to user signalling	CC	26.8.3
Testing of structured procedures		26.9
E-GSM or R-GSM signalling		26.10
Multiband signalling		26.11

26.1.3 General rules for message parameters

The following rules concerning message parameters apply to section 26:

- 1) Those values of parameters which are a consequence of the context of a test and which are not specific to that test need not be defined.
- 2) If the value of a parameter of an uplink message (MS to Network) is specified in a test, the implicit meaning is that it has to be checked; if the value is not specified, it is not to be checked unless stated otherwise.
- 3) An optional field or optional Information Element of a downlink message (Network to MS), the presence of which is not a consequence of a test description, shall be absent in that test.
- 4) If an optional field or Information Element is not indicated for the uplink (MS to Network) - unless specified otherwise -, it may be included or not.
- 5) The Protocol Discriminator, Transaction Identifier and Message Type of all uplink messages have to be checked.

26.1.4 General rules for layer 3 testing

Unless otherwise specified, before the SS pages the MS, the MS must be given the necessary time to be able to receive paging (see section 20). In addition and unless otherwise specified, the SS must wait at least 1s after the last time slot of the message block containing a CHANNEL RELEASE, before sending a PAGING to the mobile (see 04.13).

In the signalling tests, where the following statement is used:

‘the RF level of cell x is set sufficiently low to ensure that cell x is not suitable as defined in GSM 05.08 section 6.6.2’

this means that for the cell to be “not suitable” by virtue of its RF level, the RF level is to be lowered until CI is below 0.

26.1.5 Format of layer 3 test descriptions

In sections 26.2, 26.5, 26.6, 26.7, 26.9, 26.10 and 26.11 a rigorous description technique is used which is defined here.

For every test, a subsection titled "method of test" and a subsection titled "expected sequence" define the exact test steps and the verifications to be performed in the test. These sections are normative and give requirements for the MS behaviour. The information of both subsections applies.

For the message contents further normative requirements for the MS behaviour are defined in the following parts which apply in the following order (starting with the highest) on basis of the general rules of 26.1.3:

- specifications in the "method of test" and "expected sequence" subsections;
- specifications in the subsection titled "specific message contents";
- specifications in the subsection "default message contents" at the end of the relevant sections 26.5, 26.6, 26.7, 26.9, 26.10 or 26.11;
- specifications of default conditions in 26.1.

The relevant section may contain the definition of abbreviations of L3 message names that are used in that section.

In many cases, a test description contains an introductory subsection explaining the background of the relevant procedures and explaining why the tests of that description are essential.

For every test, test purposes are given. In general conformance testing methodology, the correspondence between test purposes and test cases can be n to m: To one test purpose more than one test case may correspond (e.g. different test cases checking data variations); also a test case may serve more than one test purpose. In some contexts a structure of conformance test descriptions is advisable which specifies in one part (non-duplicated) test purposes with references to corresponding test suites serving the test purposes, in another part test suites realizing the test purposes; this structuring is especially useful for gaining completeness and avoiding duplications. In this specification, however, it is preferred to group descriptions by test cases. The reasons are:

- The structure is more sought to assist the test execution and evaluation than test development. It must be easy to determine why a wrong behaviour leads to a verdict.
- The structure is to be close to GSM 11.10 phase 1.

For every test purpose of a test, a conformance requirement is given.

For each conformance requirement in a test description, references to core specifications are given.

For every test, the related PICS/PIXIT statements that are necessary for performing the test are given.

For every test, initial conditions for both the System Simulator and the Mobile Station are given. Unless otherwise specified, these initial conditions apply together with the default conditions of 26.1, the initial conditions of the test prevailing over the default conditions of 26.1.

For every test, the foreseen final state of the MS after the test and the maximum duration of the test are specified. These parts are non-normative and do not contain a description of verifications to be performed. The contained information might be used for sequencing different tests and for the decision when a test is to be interrupted.

The expected sequence specifies the actions in numbered steps in a tabular form. In the column "direction", "SS -> MS" denotes a message sent from the SS to the MS, "MS -> SS" denotes a message sent from the MS to the SS, "SS" denotes an action at the SS, "MS" denotes an action at the MS (e.g. interaction with the user or higher layers). The column "message" defines the L3 messages to be sent or expected by the SS. In the "comments" column, further normative information is to be found, e.g. message parameters. In some cases, different alternative behaviours are possible in a test. Then test steps in alternative sequences are numbered as:

"A n", "A n+1", ..., "A n+k"

"B n", "B n+1", ..., "B n+l"

"C n", "C n+1", ..., "C n+m"

etc. (n,m,l,k integers > 0)

and step numbering of a re-unified sequence resumes with the lowest of n+k+1, n+l+1, n+m+1.

In some cases the test steps of a test are to be repeated. Then an execution counter is introduced for the test.