9 Performance requirements for HSDPA

9.1 General

Receiving performance test of the UE is implemented during communicating with the SS via air interface. The procedure uses normal call protocol until the UE is communicating on traffic channel basically. (Refer to TS 34.108 [3] Common Test Environments for User Equipment (UE) Conformance Testing.) On the traffic channel, the UE provides special function for testing that is described in Logical Test Interface and the UE is tested using this function. (Refer to TS 34.109 [4] Logical Test Interface (FDD/TDD) Special conformance testing functions).

Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. Receiver characteristics for UE(s) with multiple antennas/antenna connectors are for further study.

The UE antenna performance has a significant impact on system performance, and minimum requirements on the antenna efficiency are therefore intended to be included in future versions of the present document. It is recognized that different requirements and test methods are likely to be required for the different types of UE.

All Bit Error ratio (BER) measurements shall be performed according to the general rules for statistical testing in Annex F.6.

9.2 Performance requirement for 3.84 Mcps TDD option

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.1:

Table 9.2.1: Node-B Emulator Behaviour in response to ACK/NACK/DTX

0HS-DPCCH ACK/NACK Field State	0Node-B Emulator Behaviour
1ACK	1ACK: new transmission using 1st redundancy and constellation version (RV)
2NACK	2NACK: retransmission using the next RV (up to the maximum permitted number or RV's)
3DTX	3DTX: retransmission using the RV previously transmitted to the same H-ARQ process

9.2.1 HS-DSCH throughput for Fixed Reference Channels

9.2.1.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 3.84 Mcps TDD UE from release 5 and later that support HSDPA.

9.2.1.2 Minimum requirements

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels specified in Annex C.4.1 with the addition of the relevant parameters in Tables 9.2.1.1 and 9.2.1.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1.2 and 9.2.1.4.

Table 9.2.1.1: Test parameters for fixed reference measurement channel requirements for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option) QPSK

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK			
Scrambling code and basic midamble code number*	-	0, 1			
Number of TS	-	8			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16			C(i,16) i=1..14
Number of Hybrid ARQ processes	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence**	-	{0,0,0,0} s=1, R=0, b=0			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12,04			-11.46
$\frac{\sum HS-PDSCH\_E_c}{I_{or}}$	dB	0			
I_{oc}	dBm/3,84 MHz	-60			
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					
Note **: This sequence implies Chase combining					

Table 9.2.1.2: Performance requirements for fixed reference measurement channel requirement in multipath channels for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option) QPSK

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	8,5	1300
2	PB3	9,0	1300
3	VA30	9,75	1300
4	VA120	11,5	1400

Table 9.2.1.3: Test parameters for fixed reference measurement channel requirements for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option) 16QAM

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	16QAM			
Scrambling code and basic midamble code number*	-	0, 1			
Number of TS	-	8			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16			C(i,16) i=1..14
Number of Hybrid ARQ processes	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence**	-	{0,0,0,0} s=1, r=0			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12,04			-11,46
$\frac{\sum HS-PDSCH\_E_c}{I_{or}}$	dB	0			
I_{oc}	dBm/3,84 MHz	-60			
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					
Note **: This sequence implies Chase combining					

Table 9.2.1.4: Performance requirements for fixed reference measurement channel requirement in multipath channels for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option) 16QAM

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	16,0	2600
2	PB3	17,5	2600
3	VA30	18,5	2600
4	VA120	14,5	1600

The reference for this requirement is TS 25.102 [1] clauses 9.1.1.1 and 9.1.1.2.

9.2.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value.

9.2.1.4 Method of test

9.2.1.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.10.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3 with levels according to Annex E.3.

3) Set the node B emulator ACK/NACK/DTX behaviour according to table 9.2.1. Set the test parameters and levels for tests 1-4 according to tables 9.2.1.1. The reference channel configuration is defined in section C.4.1. The configuration of the TX power for downlink physical channels is annex in E.3.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM, test 1,2,3): The information bit payload block is 52996 bits long. Hence the PRBSequence must be at least 52996 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [25].

5) Setup the fading simulator with fading conditions as described in table D.2.2.1A.

9.2.1.4.2 Procedure

a. Once the HSDPA connection is setup, start transmitting HSDPA data.

b. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc defined in Tables 9.2 and 9.4 count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3 and F.6.3.5.4.

9.2.1.5 Test Requirements

Tables 9.2.1.1 to 9.2.1.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

9.2.2 HS-DSCH throughput for Variable Reference Channels

9.2.2.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 3.84 Mcps TDD UE from release 5 and later that support HSDPA.

9.2.2.2 Minimum requirements

For the parameters specified in Table 9.2.2.1 the measured throughput R shall exceed the throughput specified in Table 9.2.2.2 for each radio condition. The variable Reference Channel is specified in Annex C.4.3.

Table 9.2.2.1: Test parameters for variable reference measurement channel requirements for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option)

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Scrambling code and basic midamble code number*	-	0, 1			
Number of TS	-	8			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16			
Number of Hybrid ARQ processes**	-	4			
Maximum number of Hybrid ARQ transmissions	-	1			
Redundancy and constellation version coding sequence	(Xrv, s, r, b)	(0, 1, 0, 0)			
HS-PDSCH$_i$_Ec/Ior	dB	–12,04			
$\frac{\sum_{1}^{i} HS-PDSCH\_Ec_i}{Ior}$	dB	0			
I_{oc}	dBm/3,84MHz	-60			
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. Note **: For timing requirements, HARQ is not active					

Table 9.2.2.2: Performance requirements for variable reference measurement channel requirement in multipath channels for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option)

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	8,8	1240
		14,8	2500
		18,8	3600
		24,8	5000
2	PB3	8,8	1220
		14,8	2430
		20,8	4030
		24,8	5080
3	VA30	10,1	1190
		16,1	2290
		20,1	3220
		24,1	4260
4	VA120	7,1	590
		11,1	1180
		15,1	1840
		19,1	2390

9.2.2.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE..

9.2.2.4 Method of test

9.2.2.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.10.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3 with levels according to Annex E.3.

3) Set the node B emulator ACK/NACK/DTX behaviour according to table 9.2.1. Set the test parameters and levels for tests 1-4 according to tables 9.2.2.1. The reference channel configuration is defined in section C.4.3. The configuration of the TX power for downlink physical channels is annex in E.3.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. Use a PRBS from ITU-T O.153 Ref [25]

5) Setup the fading simulator with fading conditions as described in table D.2.2.1A.

9.2.2.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value,then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

3) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE. Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

4) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.2.2.5 Test Requirements

Table 9.2.2.1 define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.2.2.2.

9.2.3 Reporting of HS-DSCH Channel Quality Indicator

9.2.3.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 3.84 Mcps TDD UE from release 5 and later that support HSDPA.

9.2.3.2 Minimum requirements

For the parameters specified in Table 9.2.3.1, the reported CQI value shall be in the range of +/-10 of the reported median more than 90% of the time. The BLER for the reported median CQI shall be less than 10%.

Table 9.2.3.1: Test parameters for variable reference measurement channel requirements for 7,3 Mbps – Category 8 - UE (3,84 Mcps TDD Option)

Parameters	Unit	Test 1	Test 2
Scrambling code and basic midamble code number*	-	0, 1	
Number of TS	-	8	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16	
Number of Hybrid ARQ processes**	-	4	
Maximum number of Hybrid ARQ transmissions	-	1	
Redundancy and constellation version coding sequence	(Xrv, s, r, b)	(0, 1, 0, 0)	
HS-PDSCH$_i$_Ec/Ior	dB	–12,04	
$\frac{\sum_{1}^{i} HS-PDSCH\_Ec_i}{Ior}$	dB	0	
$\hat{I}_{or} / I_{oc}$	dB	5	10
I_{oc}	dBm/3,84MHz	-60	
Note*: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. Note**: For timing requirements, HARQ is not active			

Table 9.3.3.2 Performance requirements for CQI reporting measurement channel requirements for 7.3 Mbps – Category 9- UE (3.84 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 10	90	10%
Test 2			

9.2.3.3 Test purpose

To verify that the variance of the CQI reports in an AWGN channel is within the limits defined and that a BLER of better than 10% is obtained for the median reported CQI.

9.2.3.4 Method of test

9.2.3.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3 with levels according to Annex E.3.

3) Set the node B emulator ACK/NACK/DTX behaviour according to table 9.2.1. Set the test parameters and levels for tests 1-2 according to tables 9.2.3.1. The reference channel configuration is defined in section C.4.1. The configuration of the TX power for downlink physical channels is annex in E.3.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM, test 1,2,3): The information bit payload block is 52996 bits long. Hence the PRBSequence must be at least 52996 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [25].

9.2.3.4.2 Procedure

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

1) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

2) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

3) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - 10) ≤ Median CQI ≤ (Median CQI + 10) then continue with next step , otherwise fail the UE.

4) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

5) Repeat the same procedure (steps 2 to 5) with test conditions according to the table 9.3.3.1 for Test 2, Test 3 and Test 4

9.2.3.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.1.4.2.

No test tolerance is applied to the test parameters.

9.2.4 HS-SCCH Detection Performance

void

9.2.4A HS-SCCH Detection Performance

9.2.4.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signaled on HS-SCCH, but DTX is observed in the corresponding HS-SICH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 3.84 Mcps TDD UE from release 5 and later that support HSDPA.

9.2.4.2 Minimum requirements

For the test parameters in Table 9.2.4.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.2.4.2, the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.2.4.1: Test parameters for HS-SCCH detection (3.84 Mcps TDD option)

Parameter	Unit	Test 1	Test 2	Test 3
Number of TS under test	-	1		
Number of HS-SCCH codes per timeslot	-	4		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)	-	UE1 = 0000000000000000 (UE1 under test) UE2 = 0101010101010101 UE3 = 1010101010101010 UE4 = 1111111111111111		
HS-SCCH Channelization Codes*	C(k,Q)	HS-SCCH-1 = C(1, 16), for UE1 (UE under test) HS-SCCH-2 = C(2, 16) for UE2 HS-SCCH-3 = C(3, 16) for UE3 HS-SCCH-4 = C(4, 16) for UE4		
HS-SCCH E_c/I_{or}	dB	HS-SCCH-2_E_c/I_{or} = HS-SCCH-3_E_c/I_{or} = HS-SCCH-4_E_c/I_{or}, Where, ∑ HS-SCCH-X_E_c/I_{or} = 1, where X = 1, 2, 3, 4		

Table 9.2.4.2: Minimum requirement for HS-SCCH detection (3.84 Mcps TDD option)

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-1.6	0	0.05
2	PA3	-3.0	5	0.01
3	VA30	-2.5	0	0.01

The reference for this requirement is TS 25.102 [2] clause 9.1.4.

9.2.4.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.2.4.2.

9.2.4.4 Method of test

9.2.4.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.10.
2. Setup fading simulators as fading condition, which are described in table D.2.2.1A.
3. Set the node B emulator ACK/NACK/DTX behaviour according to table 9.2.1. Set the test parameters and levels for tests 1-3 according to tables 9.2.4.1 and 9.2.4.2. The reference channel configuration is defined in section C.4.1. The configuration of the TX power for downlink physical channels is annex in E.3.

9.2.4.4.2 Procedure

1. The UE is switched on.
2. Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3.

3. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

9.2.4.5 Test Requirements

The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.2.4.2.

No test tolerance is applied to the test parameters.

9.3 Performance requirements for 1.28 Mcps TDD option

9.3.1 HS-DSCH throughput for Fixed Reference Channels

The overall performance metric for HS-DSCH requirements is the throughput "R" measured on HS-DSCH.

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-SICH is specified in Table 9.3.1.1:

Table 9.3.1.1: Node-B Emulator Behaviour in response to ACK/NACK/DTX (Fixed reference channel)

HS-DPCCH ACK/NACK Field State	Node-B Emulator Behaviour
ACK	ACK: new transmission using 1st redundancy version (RV)
NACK	NACK: retransmission using the next RV (up to the maximum permitted number or RV's)
DTX	DTX: retransmission using the RV previously transmitted to the same H-ARQ process

9.3.1A HS-DSCH throughput for Fixed Reference Channels 0.5 Mbps UE class QPSK

9.3.1A.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 0.5 Mbps UE class.

9.3.1A.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1A.1: Test parameters for fixed reference measurement channel requirements for 0.5 Mbps UE class QPSK

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK			
Scrambling code and basic midamble code number*	-	1			
Midamble		Common midamble			
Number of TS**		2			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..10			
Number of Hybrid ARQ processes	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence	-	{0,0,0,0}			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-10			
I_{oc}	dBm/1.28 MHz	-60			
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					
**Note: The timeslot just after the second switch point should be included.					

Table 9.3.1A.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for 0.5Mbps UE class QPSK

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10	160
2	PB3	10	170
3	VA30	10	161
4	VA120	10	153

9.3.1A.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for QPSK modulation.

9.3.1A.4 Method of test

9.3.1A.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1A.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3, table F.6.3.5.1..

9.3.1A.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1A.3 of test requirement.

Table 9.3.1A.3: Test requirements for fixed reference measurement channel requirement in multipath channels for 0.5Mbps UE class QPSK

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	160
2	PB3	10.6	170
3	VA30	10.6	161
4	VA120	10.6	153

The pass / fail decision for throughput is done according to Annex F.6.3.9.3.1B HS-DSCH throughput for Fixed Reference Channels 1.1 Mbps UE class 16QAM

9.3.1B.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.1 Mbps UE class..

9.3.1B.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1B.1: Test parameters for fixed reference measurement channel requirements for 1.1 Mbps UE class, 16QAM

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	16QAM			
Scrambling code and basic midamble code number*	-	1			
Midamble		Common midamble			
Number of TS**	-	2			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..12			
Number of Hybrid ARQ processes	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence	-	{6,2,1,5}			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-10.8			
I_{oc}	dBm/1.28 MHz	-60			
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: The timeslot just after the second switch point should be included.					

Table 9.3.1B.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for 1.1Mbps UE class, 16QAM

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	388
2	PB3	15	347
3	VA30	15	316
4	VA120	15	274

9.3.1B.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for 16QAM modulation.

9.3.1B.4 Method of test

9.3.1B.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1B.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3, table F.6.3.5.2.

9.3.1B.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1B.3 of test requirement.

Table 9.3.1B.3: Test requirements for fixed reference measurement channel requirement in multipath channels for 1.1Mbps UE class, 16QAM

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	388
2	PB3	15.6	347
3	VA30	15.6	316
4	VA120	15.6	274

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1C HS-DSCH throughput for Fixed Reference Channels 1.6 Mbps UE class QPSK/16QAM

9.3.1C.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.6 Mbps UE class..

9.3.1C.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1C.1: Test parameters for fixed reference measurement channel requirements for 1.6 Mbps UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
HS-PDSCH Modulation	-	QPSK				16QAM			
Scrambling code and basic midamble code number*	-	1							
Midamble		Common midamble							
Number of TS**	-	3							
Number of Hybrid ARQ processes	-	4							
Maximum number of Hybrid ARQ transmissions	-	4							
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..10				C(i,16) i=1..12			
Redundancy and constellation version coding sequence	-	{0,0,0,0}				{6,2,1,5}			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-10				-10.8			
I_{oc}	dBm/ 1.28MHz	-60							
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: The timeslot just after the second switch point should be included.									

Table 9.3.1C.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for 1.6Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10	270
2	PB3	10	278
3	VA30	10	259
4	VA120	10	242
5	PA3	15	488
6	PB3	15	471
7	VA30	15	431
8	VA120	15	377

9.3.1C.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for QPSK and 16QAM modulation.

9.3.1C.4 Method of test

9.3.1C.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1C.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3, tables F.6.3.5.3 and F.6.3.5.4.

9.3.1C.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1C.3 of test requirement.

Table 9.3.1C.3: Test requirements for fixed reference measurement channel requirement in multipath channels for 1.6Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	270
2	PB3	10.6	278
3	VA30	10.6	259
4	VA120	10.6	242
5	PA3	15.6	488
6	PB3	15.6	471
7	VA30	15.6	431
8	VA120	15.6	377

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1D HS-DSCH throughput for Fixed Reference Channels 2.2 Mbps UE class QPSK/16QAM

9.3.1D.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.2 Mbps UE class..

9.3.1D.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1D.1: Test parameters for fixed reference measurement channel requirements for 2.2 Mbps UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
HS-PDSCH Modulation	-	QPSK				16QAM			
Scrambling code and basic midamble code number*	-	1							
Minimum		Common midamble							
Number of TS**	-	4							
Number of Hybrid ARQ processes	-	4							
Maximum number of Hybrid ARQ transmissions	-	4							
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..10				C(i,16) i=1..12			
Redundancy and constellation version coding sequence	-	{0,0,0,0}				{6,2,1,5}			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-10				-10.8			
I_{oc}	dBm/ 1.28MHz	-60							
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. **Note: The timeslot just after the second switch point should be included.									

Table 9.3.1D.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for 2.2Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10	360
2	PB3	10	343
3	VA30	10	320
4	VA120	10	275
5	PA3	15	615
6	PB3	15	606
7	VA30	15	554
8	VA120	15	493

9.3.1D.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for QPSK and 16QAM modulation.

9.3.1D.4 Method of test

9.3.1D.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1D.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3, tables F.6.3.5.5 and F.6.3.5.6.

9.3.1D.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1D.3 of test requirement.

Table 9.3.1D.3: Test requirements for fixed reference measurement channel requirement in multipath channels for 2.2Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	360
2	PB3	10.6	343
3	VA30	10.6	320
4	VA120	10.6	275
5	PA3	15.6	615
6	PB3	15.6	606
7	VA30	15.6	554
8	VA120	15.6	493

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1E HS-DSCH throughput for Fixed Reference Channels 2.8 Mbps UE class QPSK/16QAM

9.3.1E.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.8 Mbps UE class..

9.3.1E.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1E.1: Test parameters for fixed reference measurement channel requirements for 2.8 Mbps UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
HS-PDSCH Modulation	-	QPSK				16QAM			
Scrambling code and basic midamble code number*	-	1							
Midamble		Common midamble							
Number of TS	-	5							
Number of Hybrid ARQ processes	-	4							
Maximum number of Hybrid ARQ transmissions	-	4							
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..10				C(i,16) i=1..12			
Redundancy and constellation version coding sequence	-	{0,0,0,0}				{6,2,1,5}			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-10				-10.8			
I_{oc}	dBm/ 1.28MHz	-60							
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.									

Table 9.3.1E.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for 2.8Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10	461
2	PB3	10	470
3	VA30	10	438
4	VA120	10	409
5	PA3	15	890
6	PB3	15	810
7	VA30	15	730
8	VA120	15	630

9.3.1E.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for QPSK and 16QAM modulation.

9.3.1E.4 Method of test

9.3.1E.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1E.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3, tables F.6.3.5.7and F.6.3.5.8.

9.3.1E.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1E.3 of test requirement.

Table 9.3.1E.3: Test requirements for fixed reference measurement channel requirement in multipath channels for 2.8Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	461
2	PB3	10.6	470
3	VA30	10.6	438
4	VA120	10.6	409
5	PA3	15.6	890
6	PB3	15.6	810
7	VA30	15.6	730
8	VA120	15.6	630

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1F HS-DSCH throughput for Fixed Reference Channels Categories 16-18- 64QAM

The overall performance metric for HS-DSCH requirements is the throughput “R” measured on HS-DSCH.

9.3.1F.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 16 - 24.

9.3.1F.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1F.1: Test parameters for fixed reference measurement channel requirements for category 16-18 UE

Parameters	Unit	Test 1 (Category 16-18)
HS-PDSCH Modulation	-	64QAM
Scrambling code and basic midamble code number*	-	1
Number of TS	-	3
Number of Hybrid ARQ processes	-	4
Maximum number of Hybrid ARQ transmissions	-	4
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..14
Redundancy and constellation version coding sequence	-	{6,5,4,0}
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-11.46
I_{oc}	dBm/ 1.28MHz	-60
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		

Table 9.3.1F.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for category 16-18 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18	660

9.3.1F.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for 64QAM modulation.

9.3.1F.4 Method of test

9.3.1F.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.6.

9.3.1F.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [25].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1F.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1F.3 of test requirement.

Table 9.3.1F.3: Test requirements for fixed reference measurement channel requirement in multipath channels for category 16-18 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18.6	660

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1G HS-DSCH throughput for Fixed Reference Channels – Categories 19-21 64QAM

9.3.1G.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 19 - 21.

9.3.1G.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1G.1: Test parameters for fixed reference measurement channel requirements for category 19-21 UE

Parameters	Unit	Test 1 (Category 19-21)
HS-PDSCH Modulation	-	64QAM
Scrambling code and basic midamble code number*	-	1
Number of TS	-	4
Number of Hybrid ARQ processes	-	4
Maximum number of Hybrid ARQ transmissions	-	4
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..14
Redundancy and constellation version coding sequence	-	{6,5,4,0}
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-11.46
I_{oc}	dBm/ 1.28MHz	-60
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		

Table 9.3.1G.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for category 19-21 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18	875

9.3.1G.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for 64QAM modulation.

9.3.1G.4 Method of test

9.3.1G.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.6.

9.3.1G.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [25].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1G.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1G.3 of test requirement.

Table 9.3.1G.3: Test requirements for fixed reference measurement channel requirement in multipath channels for category 19-21 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18.6	875

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1H HS-DSCH throughput for Fixed Reference Channels – Categories 22-24 64QAM

9.3.1H.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 16 - 18.

9.3.1H.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows table specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1H.1: Test parameters for fixed reference measurement channel requirements for category 22-24 UE

Parameters	Unit	Test 1 (Category 22-24)
HS-PDSCH Modulation	-	64QAM
Scrambling code and basic midamble code number*	-	1
Number of TS	-	5
Number of Hybrid ARQ processes	-	4
Maximum number of Hybrid ARQ transmissions	-	4
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..14
Redundancy and constellation version coding sequence	-	{6,5,4,0}
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-11.46
I_{oc}	dBm/ 1.28MHz	-60
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		

Table 9.3.1H.2: Minimum performance requirements for fixed reference measurement channel requirement in multipath channels for category 22-24 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18	1090

9.3.1H.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above for 64QAM modulation.

9.3.1H.4 Method of test

9.3.1H.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1A.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.6.

9.3.1H.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [25].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1H.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.1H.3 of test requirement.

The pass / fail decision for throughput is done according to Annex F.6.3.

Table 9.3.1H.3: Test requirements for fixed reference measurement channel requirement in multipath channels for category 22-24 UE

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	18.6	1090

9.3.1I HS-DSCH throughput for Fixed Reference Channels –MIMO UE Category 25

9.3.1I.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category25 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

If MIMO is not configured, a category 25 UE should have the capability of category 18.

9.3.1I.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1I.1: Test parameters for fixed reference measurement channels for Category 25 UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK		16QAM	
Scrambling code and basic midamble code number*	-	0			
Number of TS	-	3			
Number of Hybrid ARQ processes per stream	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16		C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{0,0,0,0}		{6,2,1,5}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04		-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)
Ioc	dBm/ 1.28MHz	-60			
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					

Table 9.3.1I.2: Performance requirements for fixed reference channels for Category 25 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10	390
2	PA3	6	160
3	PA3	16	860
4	PA3	12	370

9.3.1I.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for QPSK and 16QAM modulation.

9.3.1I.4 Method of test

9.3.1I.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A..11010a8

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1I.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM): The information bit payload block is 3650 bits long. Hence the PRBSequence must be at least 3650 * 10 bits long.) Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1I.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1I.3: Test requirements for fixed reference channels for Category 25 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	390
2	PA3	6.6	160
3	PA3	16.6	860
4	PA3	12.6	370

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1J HS-DSCH throughput for Fixed Reference Channels –MIMO UE Category 26

9.3.1J.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category 26 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

If MIMO is not configured, a category 26 UE should have the capability of category 21

9.3.1J.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1J.1: Test parameters for fixed reference measurement channels for Category 26 UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK		16QAM	
Scrambling code and basic midamble code number*	-	0			
Number of TS	-	4			
Number of Hybrid ARQ processes per stream	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16		C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{0,0,0,0}		{6,2,1,5}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04		-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)
Ioc	dBm/ 1.28MHz	-60			
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					

Table 9.3.1J.2: Performance requirements for fixed reference channels for Category 26 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	**PA3**	**10**	**650**
2	**PA3**	**6**	**220**
3	**PA3**	**16**	**950**
4	**PA3**	**12**	**380**

9.3.1J.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for QPSK and 16QAM modulation.

9.3.1J.4 Method of test

9.3.1J.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10aA.18

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1J.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1J.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1J.3: Test requirements for fixed reference channels for Category 26 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	650
2	PA3	6.6	220
3	PA3	16.6	950
4	PA3	12.6	380

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1K HS-DSCH throughput for Fixed Reference Channels –MIMO UE Category 27

9.3.1K.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category 27 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

If MIMO is not configured, a category 27 UE should have the capability of category 24

9.3.1K.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1K.1: Test parameters for fixed reference measurement channels for Category 27 UE class

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK		16QAM	
Scrambling code and basic midamble code number*	-	0			
Number of TS	-	5			
Number of Hybrid ARQ processes per stream	-	4			
Maximum number of Hybrid ARQ transmissions	-	4			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16		C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{0,0,0,0}		{6,2,1,5}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04		-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)	Fixed Dual Stream	Fixed Single Stream (2nd Stream is not used)
Ioc	dBm/ 1.28MHz	-60			
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.					

Table 9.3.1K.2: Performance requirements for fixed reference channels for Category 27 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	**PA3**	**10**	**850**
2	**PA3**	**6**	**280**
3	**PA3**	**16**	**1200**
4	**PA3**	**12**	**500**

9.3.1K.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for QPSK and 16QAM modulation.

9.3.1K.4 Method of test

9.3.1K.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10aA.18

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1K.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1K.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1K.3: Test requirements for fixed reference channels for Category 27 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	10.6	850
2	PA3	6.6	280
3	PA3	16.6	1200
4	PA3	12.6	500

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1L HS-DSCH throughput for Fixed Reference Channels –MIMO UE Category 28

9.3.1L.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category 28 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

9.3.1L.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1L.1: Test parameters for fixed reference measurement channels for Category 28 UE class

Parameters	Unit	Test 1	Test 2
HS-PDSCH Modulation	-	64QAM	
Scrambling code and basic midamble code number*	-	0	
Number of TS	-	3	
Number of Hybrid ARQ processes per stream	-	4	
Maximum number of Hybrid ARQ transmissions	-	4	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{6,5,4,0}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2^{nd} Stream is not used)
Ioc	dBm/ 1.28MHz	-60	
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.			

Table 9.3.1L.2: Performance requirements for fixed reference channels for Category 28 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	**PA3**	**20**	**800**
2	**PA3**	**18**	**540**

9.3.1L.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for 64QAM modulation.

9.3.1L.4 Method of test

9.3.1L.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10aA.18

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1L.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1L.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1L.3: Performance requirements for fixed reference channels for Category 28 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	20.6	800
2	PA3	18.6	540

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1M HS-DSCH throughput for Fixed Reference Channels –MIMO UE CategoriesCategory 29

9.3.1M.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24], and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category 29 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

9.3.1M.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1M.1: Test parameters for fixed reference measurement channels for Category 29 UE class

Parameters	Unit	Test 1	Test 2
HS-PDSCH Modulation	-	64QAM	
Scrambling code and basic midamble code number*	-	0	
Number of TS	-	4	
Number of Hybrid ARQ processes per stream	-	4	
Maximum number of Hybrid ARQ transmissions	-	4	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{6,5,4,0}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2^{nd} Stream is not used)
Ioc	dBm/ 1.28MHz	-60	
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.			

Table 9.3.1M.2: Performance requirements for fixed reference channels for Category 29 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	20	1200
2	PA3	18	780

9.3.1M.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for 64QAM modulation.

9.3.1M.4 Method of test

9.3.1M.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.18

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1M.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1M.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1M.3: Performance requirements for fixed reference channels for Category 28 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	20.6	1200
2	PA3	18.6	780

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.1N HS-DSCH throughput for Fixed Reference Channels –MIMO UE CategoriesCategory 30

9.3.1N.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and tests for category 30 apply to 1,28 Mcps TDD UEs from release 8 and later that MIMO is configured.

9.3.1N.2 Minimum requirements

For the parameters specified in below tables the measured throughput shall be equal to or better than the the specified value in belows tables specified the performance requirement. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.1N.1: Test parameters for fixed reference measurement channels for Category 30 UE class

Parameters	Unit	Test 1	Test 2
HS-PDSCH Modulation	-	64QAM	
Scrambling code and basic midamble code number*	-	0	
Number of TS	-	5	
Number of Hybrid ARQ processes per stream	-	4	
Maximum number of Hybrid ARQ transmissions	-	4	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) i=1..16	
Redundancy and constellation version coding sequence	-	{6,5,4,0}	
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-12.04	
Stream Number Configuration	-	Fixed Dual Stream	Fixed Single Stream (2^{nd} Stream is not used)
Ioc	dBm/ 1.28MHz	-60	
*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.			

Table 9.3.1N.2: Performance requirements for fixed reference channels for Category 30 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	**PA3**	**20**	**1570**
2	**PA3**	**18**	**1000**

9.3.1N.3 Test purpose

To verify that the MIMO configured UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, for 64QAM modulation.

9.3.1N.4 Method of test

9.3.1N.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.18

2) Set Ack/Nack/ DTX handling at the SS as table 9.3.1.1,Setup fading simulators as fading conditions, which are described in table D.2.2.1.A.

3) Set up a HSDPA connection according to the Generic HSDPA setup procedure. See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

4) Set the test parameters according to above tables of test parameters. The configuration of the downlink channels is defined in table C.4.2.

9.3.1N.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

2) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

3) For all relevant propagation conditions,count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.1 and F.6.3.5.2.

9.3.1N.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in tables above of test requirement.

Table 9.3.1N.3: Performance requirements for fixed reference channels for Category 28 UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	20.6	1570
2	PA3	18.6	1000

The pass / fail decision for throughput is done according to Annex F.6.3.

9.3.2 HS-DSCH throughput for Variable Reference Channels

The overall performance metric for HS-DSCH requirements is the throughput "R" measured on HS-DSCH.

9.3.2A HS-DSCH throughput for Variable Reference Channels 0.5 Mbps UE class

9.3.2A.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 0.5Mbps UE class.

9.3.2A.2 Minimum requirements

For the parameters specified in tables 9.3.2A.1 the measured throughput shall be equal to or better than the the specified value in table 9.3.2A.2. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.2A.1: Test parameters for variable reference measurement channel requirements for 0.5 Mbps UE class

Parameter	Unit	Test 1	Test 2	Test 3
HS-PDSCH Modulation and TBS	-	*		
Scrambling code and basic midamble code Number **	-	1		
Midamble		Common midamble		
Number of TS****	-	2		
Number of $DPCH_o$	-	0		
Number of HARQ Process	-	4		
Number of transmission	-	1		
Redundancy and constellation version coding sequence	Xrv	0		
HS-PDSCH Channelization Codes**	C(k,Q)	C(i,16) $1 \le i \le 10$		
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10		
Ioc	dBm	-60		

* Note 1 As requested by the last received CQI report
**Note 2 Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.
***Note 3 If the indicated CQI is 0, the Node-B emulator shall format the next HS-PDSCH transmission with the transport block size and the modulation scheme that were previously used.
****Note: The timeslot just after the second switch point should be included.

Table 9.3.2A.2: Minimum performance requirements for variable reference measurement channel requirement in multipath channels for 0.5 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	242
2	PB3	15	244
3	VA30	15	211

9.3.2A.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined in table 9.3.2A.1, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE.

9.3.2A.4 Method of test

9.3.2A.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Setup fading simulators as fading conditions , which are described in table D.2.2.1.A.

4) Set up a HSDPA connection according to the Generic HSDPA setup procedure,See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

5) Set the test parameters for tests according to above tables of test paramters

6) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

9.3.2A.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

   The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63(the first HSDPA block size isn't recorded),then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

2) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE.Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

3) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.3.2A.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.2A.3 of test requirement.

Table 9.3.2A.3: Test requirements for variable reference measurement channel requirement in multipath channels for 0.5 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	242
2	PB3	15.6	244
3	VA30	15.6	211

9.3.2B HS-DSCH throughput for Variable Reference Channels 1.1 Mbps UE class

9.3.2B.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.1Mbps UE class.

9.3.2B.2 Minimum requirements

For the parameters specified in tables 9.3.2B.1 the measured throughput shall be equal to or better than the the specified value in table 9.3.2B.2. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.2B.1: Test parameters for variable reference measurement channel requirements for 1.1 Mbps UE class

Parameter	Unit	Test 1	Test 2	Test 3
HS-PDSCH Modulation and TBS	-	*		
Scrambling code and basic midamble code Number **	-	1		
Midamble		Common midamble		
Number of TS****	-	2		
Number of $DPCH_o$	-	0		
Number of HARQ Process	-	4		
Number of transmission	-	1		
Redundancy and constellation version coding sequence	Xrv	0		
HS-PDSCH Channelization Codes**	C(k,Q)	C(i,16) $1 \le i \le 10$		
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10		
Ioc	dBm	-60		

* Note 1 As requested by the last received CQI report
**Note 2 Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.
***Note 3 If the indicated CQI is 0, the Node-B emulator shall format the next HS-PDSCH transmission with the transport block size and the modulation scheme that were previously used.
****Note: The timeslot just after the second switch point should be included.

Table 9.3.2B.2: Minimum performance requirements for variable reference measurement channel requirement in multipath channels for 1.1 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	318
2	PB3	15	323
3	VA30	15	213

9.3.2B.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined in table 9.3.2B.1, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE.

9.3.2B.4 Method of test

9.3.2B.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Setup fading simulators as fading conditions , which are described in table D.2.2.1.A.

4) Set up a HSDPA connection according to the Generic HSDPA setup procedure,See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

5) Set the test parameters for tests according to above tables of test paramters

6) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

9.3.2B.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

   The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63(the first HSDPA block size isn't recorded),then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

2) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE.Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

3) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.3.2B.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.2B.3 of testrequirement.

Table 9.3.2B.3: Test requirements for variable reference measurement channel requirement in multipath channels for 1.1 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	318
2	PB3	15.6	323
3	VA30	15.6	213

9.3.2C HS-DSCH throughput for Variable Reference Channels 1.6 Mbps UE class

9.3.2C.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.6Mbps UE class.

9.3.2C.2 Minimum requirements

For the parameters specified in tables 9.3.2C.1 the measured throughput shall be equal to or better than the the specified value in table 9.3.2C.2. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.2C.1: Test parameters for variable reference measurement channel requirements for 1.6 Mbps UE class

Parameter	Unit	Test 1	Test 2	Test 3
HS-PDSCH Modulation and TBS	-	*		
Scrambling code and basic midamble code Number **	-	1		
Midamble		Common midamble		
Number of TS****	-	3		
Number of $DPCH_0$	-	0		
Number of HARQ Process	-	4		
Number of transmission	-	1		
Redundancy and constellation version coding sequence	Xrv	0		
HS-PDSCH Channelization Codes**	C(k,Q)	C(i,16) $1 \le i \le 10$		
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10		
Ioc	dBm	-60		

* Note 1 As requested by the last received CQI report
**Note 2 Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.
***Note 3 If the indicated CQI is 0, the Node-B emulator shall format the next HS-PDSCH transmission with the transport block size and the modulation scheme that were previously used.
****Note: The timeslot just after the second switch point should be included.

Table 9.3.2C.2: Minimum performance requirements for variable reference measurement channel requirement in multipath channels for 1.6 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	480
2	PB3	15	483
3	VA30	15	323

9.3.2C.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined in table 9.3.2C.1, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE.

9.3.2C.4 Method of test

9.3.2C.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Setup fading simulators as fading conditions , which are described in table D.2.2.1.A.

4) Set up a HSDPA connection according to the Generic HSDPA setup procedure,See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

5) Set the test parameters for tests according to above tables of test paramters

6) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

9.3.2C.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

   The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63(the first HSDPA block size isn't recorded),then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

2) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE. Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

3) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.3.2C.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.2C.3 of testrequirement.

Table 9.3.2C.3: Test requirements for variable reference measurement channel requirement in multipath channels for 1.6 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	480
2	PB3	15.6	483
3	VA30	15.6	323

9.3.2D HS-DSCH throughput for Variable Reference Channels 2.2 Mbps UE class

9.3.2D.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.2Mbps UE class.

9.3.2D.2 Minimum requirements

For the parameters specified in tables 9.3.2D.1 the measured throughput shall be equal to or better than the the specified value in table 9.3.2D.2. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.2D.1: Test parameters for variable reference measurement channel requirements for 2.2 Mbps UE class

Parameter	Unit	Test 1	Test 2	Test 3
HS-PDSCH Modulation and TBS	-	*		
Scrambling code and basic midamble code Number **	-	1		
Midamble		Common midamble		
Number of TS****	-	4		
Number of $DPCH_0$	-	0		
Number of HARQ Process	-	4		
Number of transmission	-	1		
Redundancy and constellation version coding sequence	Xrv	0		
HS-PDSCH Channelization Codes**	C(k,Q)	C(i,16) 1≤i≤10		
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10		
Ioc	dBm	-60		

* Note 1 As requested by the last received CQI report
**Note 2 Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.
***Note 3 If the indicated CQI is 0, the Node-B emulator shall format the next HS-PDSCH transmission with the transport block size and the modulation scheme that were previously used.
****Note: The timeslot just after the second switch point should be included.

Table 9.3.2D.2: Minimum performance requirements for variable reference measurement channel requirement in multipath channels for 2.2 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	625
2	PB3	15	631
3	VA30	15	418

9.3.2D.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined in table 9.3.2D.1, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE.

9.3.2D.4 Method of test

9.3.2D.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Setup fading simulators as fading conditions , which are described in table D.2.2.1.A.

4) Set up a HSDPA connection according to the Generic HSDPA setup procedure,See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

5) Set the test parameters for tests according to above tables of test paramters

6) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

9.3.2D.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

   The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63(the first HSDPA block size isn't recorded),then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

2) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE. Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

3) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.3.2D.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.2D.3 of testrequirement.

Table 9.3.2D.3: Test requirements for variable reference measurement channel requirement in multipath channels for 2.2 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	625
2	PB3	15.6	631
3	VA30	15.6	418

9.3.2E HS-DSCH throughput for Variable Reference Channels 2.8 Mbps UE class

9.3.2E.1 Definition and applicability

The HS-DSCH data throughput for variable reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.2Mbps UE class.

9.3.2E.2 Minimum requirements

For the parameters specified in tables 9.3.2E.1 the measured throughput shall be equal to or better than the the specified value in table 9.3.2E.2. The reference for this requirement is TS 25.102 [1] section 9.

Table 9.3.2E.1: Test parameters for variable reference measurement channel requirements for 2.8 Mbps UE class

Parameter	Unit	Test 1	Test 2	Test 3
HS-PDSCH Modulation and TBS	-	*		
Scrambling code and basic midamble code Number **	-	1		
Midamble		Common midamble		
Number of TS	-	5		
Number of $DPCH_0$	-	0		
Number of HARQ Process	-	4		
Number of transmission	-	1		
Redundancy and constellation version coding sequence	Xrv	0		
HS-PDSCH Channelization Codes**	C(k,Q)	C(i,16) 1≤i≤10		
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10		
Ioc	dBm	-60		
* Note 1 As requested by the last received CQI report **Note 2 Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. ***Note 3 If the indicated CQI is 0, the Node-B emulator shall format the next HS-PDSCH transmission with the transport block size and the modulation scheme that were previously used.				

Table 9.3.2E.2: Minimum performance requirements for variable reference measurement channel requirement in multipath channels for 2.8 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15	783
2	PB3	15	792
3	VA30	15	544

9.3.2E.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined in table 9.3.2E.2, with the selection of QPSK and 16QAM modulation, and appropriate blocksize being determined by the SS based on the CQI reported by the UE.

9.3.2E.4 Method of test

9.3.2E.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Setup fading simulators as fading conditions , which are described in table D.2.2.1.A.

4) Set up a HSDPA connection according to the Generic HSDPA setup procedure,See TS 34.108 [3] and TS 34.109 [4] for details regarding generic HSDPA setup procedure.

5) Set the test parameters for tests according to above tables of test paramters

6) The information bit data shall be pseudo random and not repeated not before 10 different information bit payload blocks are processed. Use a PRBS from ITU-R O.153 Ref [26].

9.3.2E.4.2 Procedure

1) Once the HSDPA connection is setup, start transmitting HSDPA Data.

   The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63(the first HSDPA block size isn't recorded),then SS will decode the CQI report and transmit a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.

2) For any HSDPA block transmitted by the SS, record transmitted block size and relevant received ACK, NACK and statDTX reported by UE. If UE reports ACK,the transmitted block is correctly received by UE. Continue transmission of the HS-PDSCH data and record transmitted block size until [2000] records have been reached.

3) For all relevant propagation conditions ,calculate the throughput, which is the ratio of the sum of correctly received transport bits over the testing time. [2000] multiplied by transmission time interval is the testing time.

9.3.2E.5 Test Requirements

Tables of test parameters define the primary level settings including test tolerance for all relevant throughput tests. the measured throughput shall be equal to or better than the the specified value in table 9.3.2E.3 of testrequirement.

Table 9.3.2E.3: Test requirements for variable reference measurement channel requirement in multipath channels for 2.8 Mbps UE class

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	15.6	783
2	PB3	15.6	792
3	VA30	15.6	544

9.3.3 Reporting of HS-DSCH Channel Quality Indicator

9.3.3A Reporting of HS-DSCH Channel Quality Indicator-0.5Mbps UE class

9.3.3A.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 0.5 Mbps UE class.

9.3.3A.2 Minimum requirements

For the parameters specified in tables 9.3.3.1 the UE shall report a CQI value within the limits of table 9.3.3A.2.

Table 9.3.3A.1: Test parameters for CQI reporting measurement channel requirements for 0.5Mbps UE class

		0.5Mbps UE
Parameter	**Unit**	**Test 1**
Number of TS	-	2
Number of HS-PDSCH codes per TS	-	10
HS-PDSCH$_i$_Ec/Ior	dB	-10
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤10
Number of DPCH$_0$	-	0
Number of HARQ Process	-	4
Number of transmission	-	1
$\hat{I}_{or} / I_{oc}$	dB	1

Table 9.3.3A.2 Performance requirements for CQI reporting measurement channel requirements for 0.5Mbps UE class

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 3	90	10%

9.3.3A.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3A.4 Method of test

9.3.3A.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

Note: The following value of x is derived from Table 9.3.3A.2

9.3.3A.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3A.1.

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

9.3.3A.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3A.4.2.

No test tolerance is applied to the test parameters.

9.3.3B Reporting of HS-DSCH Channel Quality Indicator-1.1Mbps UE class

9.3.3B.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.1 Mbps UE class..

9.3.3B.2 Minimum requirements

For the parameters specified in tables 9.3.3B.1 the UE shall report a CQI value within the limits of table 9.3.3B.2.

Table 9.3.3B.1: Test parameters for CQI reporting measurement channel requirements for 1.1Mbps UE class

		1.1Mbps UE	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	2	
Number of HS-PDSCH codes per TS	-	10	
HS-PDSCH$_i$_Ec/Ior	dB	-10	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) $1 \le i \le 10$	
Number of DPCH$_0$	-	0	
Number of HARQ Process	-	4	
Number of transmission	-	1	
$\hat{I}_{or} / I_{oc}$	dB	1	8

Table 9.3.3B.2 Performance requirements for CQI reporting measurement channel requirements for 1.1Mbps U E class

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 3	90	10%
Test 2	+/- 2	90	

9.3.3B.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3B.4 Method of test

9.3.3B.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

Note: The following value of x is derived from Table 9.3.3B.2

9.3.3B.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3B.1.

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

6) Repeat the same procedure (steps 2 to 5) with test conditions according to the table 9.3.3B.1.

9.3.3B.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3B.4.2.

No test tolerance is applied to the test parameters.

9.3.3C Reporting of HS-DSCH Channel Quality Indicator-1.6Mbps UE class

9.3.3C.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 1.6 Mbps UE class..

9.3.3C.2 Minimum requirements

For the parameters specified in tables 9.3.3C.1 the UE shall report a CQI value within the limits of table 9.3.3C.2.

Table 9.3.3C.1: Test parameters for CQI reporting measurement channel requirements for 1.6Mbps UE class

		1.6Mbps UE	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	3	
Number of HS-PDSCH codes per TS	-	10	
HS-PDSCH$_i$_Ec/Ior	dB	-10	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) $1 \le i \le 10$	
Number of DPCH$_0$	-	0	
Number of HARQ Process	-	4	
Number of transmission	-	1	
$\hat{I}_{or} / I_{oc}$	dB	1	8

Table 9.3.3C.2 Performance requirements for CQI reporting measurement channel requirements for 1.6Mbps U E class

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	+/- 2	90	

9.3.3C.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3C.4 Method of test

9.3.3C.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

Note: The following value of x is derived from Table 9.3.3C.2

9.3.3C.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3C.1.

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI

indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

6) Repeat the same procedure (steps 2 to 5) with test conditions according to the table 9.3.3C.1.

9.3.3C.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3C.4.2.

No test tolerance is applied to the test parameters.

9.3.3D Reporting of HS-DSCH Channel Quality Indicator-2.2Mbps UE class

9.3.3D.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.2 Mbps UE class..

9.3.3D.2 Minimum requirements

For the parameters specified in tables 9.3.3D.1 the UE shall report a CQI value within the limits of table 9.3.3D.2.

Table 9.3.3D.1: Test parameters for CQI reporting measurement channel requirements for 2.2Mbps UE class

		1.6Mbps UE	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	4	
Number of HS-PDSCH codes per TS	-	10	
HS-PDSCH$_i$_Ec/Ior	dB	-10	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤10	
Number of DPCH$_0$	-	0	
Number of HARQ Process	-	4	
Number of transmission	-	1	
$\hat{I}_{or} / I_{oc}$	dB	1	8

Table 9.3.3D.2 Performance requirements for CQI reporting measurement channel requirements for 2.2Mbps UE class

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	+/- 2	90	

9.3.3D.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3D.4 Method of test

9.3.3D.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

Note: The following value of x is derived from Table 9.3.3D.2

9.3.3D.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3D.1.

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

6) Repeat the same procedure (steps 2 to 5) with test conditions according to the table 9.3.3D.1.

9.3.3D.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3D.4.2.

No test tolerance is applied to the test parameters.

9.3.3E Reporting of HS-DSCH Channel Quality Indicator-2.8Mbps UE class

9.3.3E.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA which is 2.8 Mbps UE class..

9.3.3E.2 Minimum requirements

For the parameters specified in tables 9.3.3E.1 the UE shall report a CQI value within the limits of table 9.3.3E.2.

Table 9.3.3E.1: Test parameters for CQI reporting measurement channel requirements for 2.8Mbps UE class

		2.2Mbps UE	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	5	
Number of HS-PDSCH codes per TS	-	10	
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-10	
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) $1 \le i \le 10$	
Number of $DPCH_o$	-	0	
Number of HARQ Process	-	4	
Number of transmission	-	1	
$\hat{I}_{or} / I_{oc}$	dB	1	8

Table 9.3.3E.2 Performance requirements for CQI reporting measurement channel requirements for 2.8Mbps U E class

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	+/- 2	90	

9.3.3E.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3E.4 Method of test

9.3.3E.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

Note: The following value of x is derived from Table 9.3.3E.2

9.3.3E.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3E.1.

Note: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

6) Repeat the same procedure (steps 2 to 5) with test conditions according to the table 9.3.3E.1.

9.3.3E.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3E.4.2.

No test tolerance is applied to the test parameters.

9.3.3F Reporting of HS-DSCH Channel Quality Indicator – 64QAM UE capability categories 16 - 18

9.3.3F.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 16 - 18.

9.3.3F.2 Minimum requirements

For the parameters specified in tables 9.3.3A.1 the UE shall report a CQI value within the limits of table 9.3.3F.2.

Table 9.3.3F.1: Test parameters for CQI reporting measurement channel requirements for UE capability categories 16 - 18

		Category 16-18
Parameter	**Unit**	**Test 1**
Number of TS	-	3
Number of HS-PDSCH codes per TS	-	14
HS-PDSCH$_i$_Ec/Ior	dB	-11.46
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤14
Number of DPCH$_0$	-	0
Number of HARQ Process	-	4
Number of transmission	-	1
I_{oc}**	dBm/1.28MHz	*-60*
$\hat{I}_{or} / I_{oc}$	dB	18
Propagation Channel	-	AWGN
*Note 1: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		
**Note 2: For multi-carrier reception, it refers to $\frac{\hat{I}_{or}}{I_{oc}}$ on each carrier.		

Table 9.3.3F.2: Performance requirements for CQI reporting measurement channel requirements for UE capability categories 16 - 18

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%

9.3.3F.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3F.4 Method of test

9.3.3F.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

NOTE: The following value of x is derived from Table 9.3.3F.2

9.3.3F.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3F.1.

NOTE: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

9.3.3F.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3F.4.2.

No test tolerance is applied to the test parameters.

9.3.3G Reporting of HS-DSCH Channel Quality Indicator – 64QAM UE capability categories 19 - 21

9.3.3G.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 19 - 21.

9.3.3G.2 Minimum requirements

For the parameters specified in tables 9.3.3G.1 the UE shall report a CQI value within the limits of table 9.3.3G.2.

Table 9.3.3G.1: Test parameters for CQI reporting measurement channel requirements for UE capability categories 19 - 21

		Category 19-21
Parameter	**Unit**	**Test 1**
Number of TS	-	4
Number of HS-PDSCH codes per TS	-	14
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-11.46
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤14
Number of $DPCH_0$	-	0
Number of HARQ Process	-	4
Number of transmission	-	1
I_{oc}**	dBm/1.28MHz	*-60*
$\hat{I}_{or} / I_{oc}$	dB	18
Propagation Channel	-	AWGN
*Note 1: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		
**Note 2: For multi-carrier reception, it refers to $\frac{\hat{I}_{or}}{I_{oc}}$ on each carrier.		

Table 9.3.3G.2: Performance requirements for CQI reporting measurement channel requirements for UE capability categories 19 - 21

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%

9.3.3G.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3G.4 Method of test

9.3.3G.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

NOTE: The following value of x is derived from Table 9.3.3G.2

9.3.3G.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3G.1.

NOTE: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

9.3.3G.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3G.4.2.

No test tolerance is applied to the test parameters.

9.3.3H Reporting of HS-DSCH Channel Quality Indicator – 64QAM UE capability categories 22 - 24

9.3.3H.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [1], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 8 and later that support HSDPA UE capability categories 22 - 24.

9.3.3H.2 Minimum requirements

For the parameters specified in tables 9.3.3H.1 the UE shall report a CQI value within the limits of table 9.3.3H.2.

Table 9.3.3H.1: Test parameters for CQI reporting measurement channel requirements for UE capability categories 22 - 24

		Category 22-24
Parameter	**Unit**	**Test 1**
Number of TS	-	5
Number of HS-PDSCH codes per TS	-	14
HS-PDSCH$_i$_Ec/Ior	dB	-11.46
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤14
Number of DPCH$_o$	-	0
Number of HARQ Process	-	4
Number of transmission	-	1
I_{oc}**	dBm/1.28MHz	*-60*
$\hat{I}_{or} / I_{oc}$	dB	18
Propagation Channel	-	AWGN
*Note 1: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.		
**Note 2: For multi-carrier reception, it refers to $\frac{\hat{I}_{or}}{I_{oc}}$ on each carrier.		

Table 9.3.3H.2: Performance requirements for CQI reporting measurement channel requirements for UE capability categories 22 - 24

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%

9.3.3H.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, such that CQI reported by the UE falls within the acceptable range.

9.3.3H.4 Method of test

9.3.3H.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, and an AWGN source to the UE antenna connector as shown in figure A.9.

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

NOTE: The following value of x is derived from Table 9.3.3H.2

9.3.3H.4.2 Procedure

1) Set test conditions according to test 1 according table 9.3.3H.1.

NOTE: the following part of the procedure will test, if the UE reports a limited range of CQI indicator under the predefined channel conditions.

2) The SS shall transmit a HSDPA block to UE selecting any TBS value excluding 0 or 63,then SS will decodes the CQI report and transmits a new block on the HS-DSCH with the transport block size and modulation scheme recommended by the UE.For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side). This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

9.3.3H.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3H.4.2.

No test tolerance is applied to the test parameters.

9.3.3IReporting of HS-DSCH Channel Quality Indicator – category 25 MIMO

9.3.3I.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 25 from release 8 and later.

9.3.3I.2 Minimum requirements

For the parameters specified in tables 9.3.3I.1 the UE categories 25 shall report a CQI value within the limits of table 9.3.3I.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3I.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 25	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	3	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
$HS\text{-}PDSCH_i\_Ec/Ior$	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) 1≤i≤16	
Number of $DPCH_o$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	8	10
Stream Number configuration	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3I.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	+/- 2	90	

9.3.3I.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3I.4 Method of test

9.3.3I.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.18

2) Set Ack/Nack/DTX handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks.

3) Set up a call according to the Generic call setup procedure.

See TS 34.108 [3] and TS 34.109 [4] for details regarding generic call setup procedure.

9.3.3I.4.2 Procedure

For test 1, the test procedure is as followed:

1) Set test conditions according to test 1 according table 9.3.3I.1.

2) The SS shall transmit a HSDPA block on one antenna to UE, selecting any TBS value excluding 0 or 63, then SS will decodes CQI report and transmits a new block on HS-DSCH with the transport block size and modulation scheme recommended by the UE on the other antenna. For any HSDPA block transmitted by the SS, record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of the HS-PDSCH data and collect RTBS value of CQI until [2000] reports have been gathered.

3) Set up a relative frequency distribution for the RTBS value of CQI indicator reported. Calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side) . This RTBS value of CQI indicator is declared as Median CQI value,

4) If [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI - x) ≤ Median CQI ≤ (Median CQI + x) then continue with next step , otherwise fail the UE.

5) Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

For test 2, the test procedure is as followed:

1) Set test conditions according to test 1 according table 9.3.3I.1.

2) The SS shall transmit two streams on each antenna to UE, each with a sequence of HSDPA blocks. For each stream, SS firstly transmit a HSDPA block, selecting any TBS value excluding 0 or 63, then SS will decodes CQI report and transmits a new block on HS-DSCH with the transport block size and modulation scheme recommended by the UE. For any HSDPA block transmition, the SS shall record the received RTBS value of CQI indicator and the ACK, NACK and statDTX . Continue transmission of each streams of HS-PDSCH data and collect RTBS value of CQI until [2000] reports for this stream have been gathered.

3) For each stream, the SS set up a relative frequency distribution for the RTBS value of CQI indicator reported, then calculate the median value (Median RTBS is the RTBS that is at or crosses 50% distribution from the lower RTBS side) for this stream. This RTBS value of CQI indicator is declared as Median CQI-stream value,

4) For each stream, if [1800] or more of the RTBS value of CQI indicator are in the range (Median CQI-stream - x) ≤ Median CQI-stream ≤ (Median CQI-stream + x) then continue with next step , otherwise fail the UE.

5) For each stream, Calculate the the ratio (NACK + statDTX / ACK + NACK + statDTX) when the SS transmit the TBS according to the median-CQI-stream value.If the ratio< 0.1 ,then pass the UE,otherwise fail the UE.

9.3.3I.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3I.4.2.

No test tolerance is applied to the test parameters.

9.3.3J Reporting of HS-DSCH Channel Quality Indicator – category 26 MIMO

9.3.3J.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 26 from release 8 and later.

9.3.3J.2 Minimum requirements

For the parameters specified in tables 9.3.3J.1 the UE categories 26 shall report a CQI value within the limits of table 9.3.3J.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3J.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 26	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	4	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
HS-PDSCH$_i$_Ec/Ior	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) 1≤i≤16	
Number of DPCH$_o$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	8	10
Stream Number configuration	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3J.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	**+/- 2**	**90**	

9.3.3J.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3J.4 Method of test

9.3.3J.4.1 Initial conditions

<FFS> According to 9.3.3I

9.3.3J.4.2 Procedure

<FFS> According to 9.3.3I

9.3.3J.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3J.4.2.

No test tolerance is applied to the test parameters.

9.3.3K Reporting of HS-DSCH Channel Quality Indicator – category 27 MIMO

9.3.3K.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 27 from release 8 and later.

9.3.3K.2 Minimum requirements

For the parameters specified in tables 9.3.3K.1 the UE categories 27 shall report a CQI value within the limits of table 9.3.3K.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3K.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 27	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	5	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
HS-PDSCH$_i$_Ec/Ior	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) 1≤i≤16	
Number of DPCH$_o$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	8	10
Stream Number configuration	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3K.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	**Permitted CQI range from median (x)**	**% of time that CQI must be within +/- x of median (Y)**	**Maximum BLER for median reported CQI**
Test 1	**+/-2**	**90**	10%
Test 2	+/-2	90	

9.3.3K.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3K.4 Method of test

9.3.3K.4.1 Initial conditions

<FFS> According to 9.3.3I

9.3.3K.4.2 Procedure

<FFS> According to 9.3.3I

9.3.3K.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3K.4.2.

No test tolerance is applied to the test parameters.

9.3.3L Reporting of HS-DSCH Channel Quality Indicator – category 28 MIMO

9.3.3L.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 28 from release 8 and later.

9.3.3L.2 Minimum requirements

For the parameters specified in tables 9.3.3L.1 the UE categories 28 shall report a CQI value within the limits of table 9.3.3L.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3L.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 28	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	3	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
$HS\text{-}PDSCH_i\_Ec/Ior$	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) $1 \le i \le 16$	
Number of $DPCH_o$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	16	18
Stream Number	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3L.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	+/- 2	90	

9.3.3L.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3L.4 Method of test

9.3.3L.4.1 Initial conditions

<FFS> According to 9.3.3I

9.3.3L.4.2 Procedure

<FFS> According to 9.3.3I

9.3.3L.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3L.4.2.

No test tolerance is applied to the test parameters.

9.3.3M Reporting of HS-DSCH Channel Quality Indicator – category 29 MIMO

9.3.3M.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 29 from release 8 and later.

9.3.3M.2 Minimum requirements

For the parameters specified in tables 9.3.3M.1 the UE categories 29 shall report a CQI value within the limits of table 9.3.3M.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3M.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 29	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	4	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
HS-PDSCH$_i$_Ec/Ior	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) $1 \le i \le 16$	
Number of DPCH$_o$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	16	18
Stream Number	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3M.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	+/- 2	90	10%
Test 2	**+/- 2**	**90**	

9.3.3M.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3M.4 Method of test

9.3.3M.4.1 Initial conditions

<FFS> According to 9.3.3I

9.3.3M.4.2 Procedure

<FFS> According to 9.3.3I

9.3.3M.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3M.4.2.

No test tolerance is applied to the test parameters.

9.3.3N Reporting of HS-DSCH Channel Quality Indicator – category 30 MIMO

9.3.3N.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN and static orthogonal environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median. The CQI is measured while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [21], section 9.

The requirements and this test apply to 1,28 Mcps TDD MIMO capable UEs category 30 from release 8 and later.

9.3.3N.2 Minimum requirements

For the parameters specified in tables 9.3.3L.1 the UE categories 30 shall report a CQI value within the limits of table 9.3.3L.2.

The MIMO dual stream static orthogonal propagation conditions are defined in Annex D.2.5.1. For UE supporting Spreading Factor 1 only in dual stream transmission, the number of HS-PDSCH codes per TS should be configured to 1 in dual stream transmission, and the HS-PDSCHi_Ec/Ior should be 0dB.

Table 9.3.3N.1: Test parameters for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

		Category 30	
Parameter	**Unit**	**Test 1**	**Test 2**
Number of TS	-	5	
Number of HS-PDSCH codes per TS	-	16	
Number of HS-PDSCH codes per TS	-	16	
$HS\text{-}PDSCH_i$_Ec/Ior	dB	-12.04	
HS-PDSCH Channelization Codes	C(k,Q)	C(i,16) 1≤i≤16	
Number of $DPCH_0$	-	0	
Number of HARQ Process per stream	-	4	
Number of transmission	-	1	
Ioc	dBm	-60	
$\hat{I}_{or} / I_{oc}$	dB	16	18
Stream Number	-	Single Stream	Dual Stream
Propagation Channel	-	AWGN	Static Orthogonal

Table 9.3.3N.2: Performance requirements for CQI reporting measurement channel requirements (1.28 Mcps TDD Option)

Test	Permitted CQI range from median (x)	% of time that CQI must be within +/- x of median (Y)	Maximum BLER for median reported CQI
Test 1	**+/- 2**	**90**	10%
Test 2	+/- 2	90	

9.3.3N.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined above, such that CQI reported by the UE falls within the acceptable range.

9.3.3N.4 Method of test

9.3.3N.4.1 Initial conditions

<FFS> According to 9.3.3I

9.3.3N.4.2 Procedure

<FFS> According to 9.3.3I

9.3.3N.5 Test Requirements

The pass fail decision as specified in the test procedure in 9.3.3N.4.2.

No test tolerance is applied to the test parameters.

9.3.4 HS-SCCH Detection Performance

9.3.4.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signaled on HS-SCCH, but DTX is observed in the corresponding HS-SICH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

This corresponds to case when the SS indicates to the UE via the HS-SCCH that HSDPA data is to be sent, but the UE fails to decode this correctly.

The normative reference for this test is 25.102 [2], section 9.

The requirements and this test apply to 1,28 Mcps TDD UE from release 5 and later that support HSDPA.

9.3.4.2 Minimum requirements

For the parameters specified in tables 9.3.4.1, for each value of HS-SCCH $\hat{I}_{or}/I_{oc}$ specified in Table 9.3.4.3 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The reference for this requirement is TS 25.102 [1] section 9.

9.3.4.3 Test purpose

To verify that the UE receiver is capable meeting the minimum requirements for support of HSDPA in the conditions defined below, and does not report a DTX when valid data was sent, more often than the performance limits allow.

Table 9.3.4.1: Test parameters for HS-SCCH detection (1.28Mcps TDD option)

Parameter	Unit	Test 1	Test2
Number of TS under test	-	1	
Number of HS-SCCH codes per timeslot	-	8 (4 x2)	
Scrambling code and basic midamble code number*	-	0	
Midamble		Common midamble	
Number of $DPCH_o$	-	2	
Number of H-ARQ process	-	4	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)	-	UE1 = 0000000000000000 (UE1 under test) UE2 = 0101010101010101 UE3 = 1010101010101010 UE4 = 1111111111111111	
HS-SCCH Channelization Codes*	C(k,Q)	C(i,16) 1≤i≤8	
HS-SCCH Channelization Codes for UE under test	C(k,Q)	C(i,16) 1≤i≤2	
$DPCH_o$ Channelization Codes	C(k,Q)	C(i,16) 9≤i≤10	
$\frac{HS-SCCH_i\_E_c}{I_{or}}$	dB	-10	
I_{oc}	dBm/1.28MHz	-60	
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.			

Table 9.3.4.2: Test parameters for HS-PDSCH (1.28Mcps TDD option)

Parameter	Unit	Test 1	Test2
Number of TS under test	-	2	
Number of HS-PDSCH codes per timeslot	-	10	
Scrambling code and basic midamble code number*	-	0	
HS-PDSCH Channelization Codes for UE under test	C(k,Q)	C(i,16) 1≤i≤10	
$\frac{HS-\mathrm{PDSCH}_{i}\_E_c}{I_{or}}$	dB	-10	
I_{oc}	dBm/1.28MHz	-60	
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	**	
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. Note **: Allocate a sufficient power to $\frac{\hat{I}_{or}}{I_{oc}}$ so that probability of missing HS-DPSCH is very low.			

Table 9.3.4.3: Minimum requirement for HS-SCCH detection (1.28Mcps TDD option)

Test Number	Propagation Conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	$P(E_m)$
1	PA3	16	0.01
2	VA30	12	0.01

The propagation conditions are described in Annex D.

9.3.4.4 Method of test

9.3.4.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10.

2) Set Ack/Nack handling at the SS as table 9.3.1.1 (Fixed channel test)

3) Set up test parameter according to table 9.3.4.1 and able 9.3.4.2.

9.3.4.4.2 Procedure

1. The UE is switched on.

2. An RRC connection is set-up according to the generic HSDPA set-up procedure specified in TS 34.108 [3].

3. Count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

9.3.4.5 Test Requirements

The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.3.4.4.

Table 9.3.4.4: Test requirement for HS-SCCH detection (1.28Mcps TDD option)

Test Number	Propagation Conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	$P(E_m)$
1	PA3	16.6	0.01
2	VA30	12.6	0.01

9.4 Performance requirement for 7.68 Mcps TDD option

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.4.1:

Table 9.4.1: Node-B Emulator Behaviour in response to ACK/NACK/DTX

HS-DPCCH ACK/NACK Field State	Node-B Emulator Behaviour
ACK	ACK: new transmission using 1st redundancy and constellation version (RV)
NACK	NACK: retransmission using the next RV (up to the maximum permitted number or RV's)
DTX	DTX: retransmission using the RV previously transmitted to the same H-ARQ process

9.4.1 HS-DSCH throughput for Fixed Reference Channels

9.4.1.1 Definition and applicability

The HS-DSCH data throughput for fixed reference channels is defined by the capabilities of the UE as defined in [24] , and the throughput is measured by counting the amount of data succeesfully received at the UE by monitoring the ACK/NACK signalling field of the HS-SICH received at the SS, while random data is streamed from the SS to the UE.

The normative reference for this test is 25.102 [2], section 9.3.

The requirements and this test apply to 7.68 Mcps TDD UE from release 7 and later that support HSDPA.

9.4.1.2 Minimum requirements

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels specified in Annex C.4.2A with the addition of the relevant parameters in Tables 9.4.1.1 and 9.4.1.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.4.1.2 and 9.4.1.4.

Table 9.4.1.1: Test parameters for fixed reference measurement channel requirements for 5,3 Mbps – Category 8 - UE (7,68 Mcps TDD Option) QPSK

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	QPSK			
Scrambling code and basic midamble code number*	-	0, 1			
Number of TS	-	4			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,32) i=1..32			
Number of Hybrid ARQ processes	-	3			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence**	-	{0,0,0,0} s=1, R=0, b=0			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-15,05			
$\frac{\sum HS-PDSCH\_E_c}{I_{or}}$	dB	0			
I_{oc}	dBm/7,68 MHz	-60			
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. Note **: This sequence implies Chase combining					

Table 9.4.1.2: Performance requirements for fixed reference measurement channel requirement in multipath channels for 5,3 Mbps – Category 8 - UE (7,68 Mcps TDD Option) QPSK

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	5,2	880
2	PB3	5,5	880
3	VA30	6,2	880
4	VA120	6,2	880

Table 9.4.1.3: Test parameters for fixed reference measurement channel requirements for 5,3 Mbps – Category 8 - UE (7,68 Mcps TDD Option) 16QAM

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
HS-PDSCH Modulation	-	16QAM			
Scrambling code and basic midamble code number*	-	0, 1			
Number of TS	-	4			
HS-PDSCH Channelization Codes*	C(k,Q)	C(i,32) i=1..32			
Number of Hybrid ARQ processes	-	3			
Maximum number of Hybrid ARQ transmissions	-	4			
Redundancy and constellation version coding sequence**	-	{0,0,0,0} s=1, R=0, b=0			
$\frac{HS-PDSCH\_E_c}{I_{or}}$	dB	-15,05			
$\frac{\sum HS-PDSCH\_E_c}{I_{or}}$	dB	0			
I_{oc}	dBm/7,68 MHz	-60			
Note *: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code. Note **: This sequence implies Chase combining					

Table 9.4.1.4: Performance requirements for fixed reference measurement channel requirement in multipath channels for 5,3 Mbps – Category 8 - UE (7,68 Mcps TDD Option) 16QAM

Test Number	Propagation conditions	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	R (Throughput) [kbps]
1	PA3	11,1	1765
2	PB3	13,2	1765
3	VA30	13,7	1765
4	VA120	13,6	1765

The reference for this requirement is TS 25.102 [1] clauses 9.3.1.1 and 9.3.1.2.

9.4.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value.

9.4.1.4 Method of test

9.4.1.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.10.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3 with levels according to Annex E.3.

3) Set the node B emulator ACK/NACK/DTX behaviour according to table 9.4.1. Set the test parameters and levels for tests 1-4 according to tables 9.4.1.1. The reference channel configuration is defined in section C.4.2A. The configuration of the TX power for downlink physical channels is annex in E.3.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition (16 QAM, test 1,2,3): The information bit payload block is 52996 bits long. Hence the PRBSequence must be at least 52996 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [25].

5) Setup the fading simulator with fading conditions as described in table D.2.2.3.2 or D.2.2.3.4 depending on the frequency band.

9.4.1.4.2 Procedure

a. Once the HSDPA connection is setup, start transmitting HSDPA data.

b. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc defined in Tables 9.4.1.2 and 9.4.1.4 count the number of NACK, ACK and statDTX on the UL HS-SICH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.5 and F.6.3.5.6.

9.4.1.5 Test Requirements

Tables 9.4.1.1 to 9.4.1.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

9.4.2 HS-DSCH throughput for Variable Reference Channels

FFS

9.4.3 Reporting of HS-DSCH Channel Quality Indicator

FFS

9.4.4 HS-SCCH Detection Performance

9.4.4.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signaled on HS-SCCH, but DTX is observed in the corresponding HS-SICH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The normative reference for this test is 25.102 [2], section 9.3.4.

The requirements and this test apply to 7.68 Mcps TDD UE from release 7 and later that support HSDPA.

9.4.4.2 Minimum requirements

For the test parameters in Table 9.4.4.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4.2, the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.4.4.1: Test parameters for HS-SCCH detection (7.68 Mcps TDD option)

Parameter	Unit	Test 1	Test 2	Test 3
Number of TS under test	-	1		
Number of HS-SCCH codes per timeslot	-	4		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)	-	UE1 = 0000000000000000 (UE1 under test) UE2 = 0101010101010101 UE3 = 1010101010101010 UE4 = 1111111111111111		
HS-SCCH Channelization Codes*	C(k,Q)	HS-SCCH-1 = C(1, 32), for UE1 (UE under test) HS-SCCH-2 = C(2, 32) for UE2 HS-SCCH-3 = C(3, 32) for UE3 HS-SCCH-4 = C(4, 32) for UE4		
HS-SCCH E_c/I_{or}	dB	HS-SCCH-2_E_c/I_{or} = HS-SCCH-3_E_c/I_{or} = HS-SCCH-4_E_c/I_{or}, Where, ∑ HS-SCCH-X_E_c/I_{or} = 1, where X = 1, 2, 3, 4		

Table 9.4.4.2: Minimum requirement for HS-SCCH detection (7.68 Mcps TDD option)

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-6.0	0	0.05
2	PA3	-7.5	5	0.01
3	VA30	-6.0	0	0.01

The reference for this requirement is TS 25.102 [2] clause 9.3.4.

9.4.4.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.4.2.

9.4.4.4 Method of test

9.4.4.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.10.
2. Setup fading simulators as fading condition, which are described in table D.2.2.3.1.
3. Set the node B emulator ACK/NACK/DTX behaviour according to table 9.2.1. Set the test parameters and levels for tests 1-3 according to tables 9.4.4.1 and 9.4.4.2. The reference channel configuration is defined in section C.4.2A. The configuration of the TX power for downlink physical channels is annex in E.3.

9.4.4.4.2 Procedure

1. The UE is switched on.
2. Set up an HSDPA call according to TS 34.108 [3] clause 7.3.6.3.
3. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

9.4.4.5 Test Requirements

The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.4.2.

No test tolerance is applied to the test parameters.

10 Performance requirements (MBMS)

10.1 Demodulation of MCCH

10.1.1 Definition and applicability

10.1.1.1 3.84 Mcps TDD Option

The receive characteristic of the MCCH is determined by the RLC SDU error rate (RLC_SDU_ER). The requirement is valid for all RRC states for which the UE has capabilities.

The requirements and this test apply to the 3,84 Mcps TDD UE.

10.1.1.2 7.68 Mcps TDD Option

The receive characteristic of the MCCH is determined by the RLC SDU error rate (RLC_SDU_ER). The requirement is valid for all RRC states for which the UE has capabilities.

The requirements and this test apply to the 7,68 Mcps TDD UE.

10.1.2 Minimum requirement

10.1.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 10.1.1, the measured average downlink S-CCPCH_E_c/I_{or} power ratio shall be below the specified value for the RLC_SDU_ER shown in Table 10.1.2.

Table 10.1.1: Test parameters for MCCH detection

Parameters	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	-3
Number of Interfering codes/timeslot	-	7 × SF16
MCCH Data Rate	kbps	7.2
Propagation condition	-	VA3

Table 10.1.2: Test requirements for MCCH detection

Test Number	S-CCPCH_Ec/Ior (dB)	RLC_SDU_ER
1	-1.25	0.01

10.1.2.2 7.68 Mcps TDD Option

For the parameters specified in Table 10.1.3, the measured average downlink S-CCPCH_E_c/I_{or} power ratio shall be below the specified value for the RLC_SDU_ER shown in Table 10.1.4.

Table 10.1.3: Test parameters for MCCH detection

Parameters	Unit	Test 1
I_{oc}	dBm/7.68 MHz	-60
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	-3
Number of Interfering codes/timeslot	-	15 × SF32
MCCH Data Rate	kbps	7.2
Propagation condition	-	VA3

Table 10.1.4: Test requirements for MCCH detection

Test Number	S-CCPCH_Ec/Ior (dB)	RLC_SDU_ER
1	-4.7	0.01

10.1.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for the MCCH channel does not exceed 0.01.

10.1.4 Method of test

10.1.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.10.

2) The MCCH Reference Measurement Channel parameters are defined in Annex C.5.1.

3) The configuration for the downlink channel for each radio link is defined in Annex E.

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10.

6) Setup the test parameter for MCCH detection test as specified in Table 10.1.1 and 10.1.2 for 3.84 Mcps TDD and Table 10.1.3. and 10.1.4 for 7.68 Mcps TDD. Set up fading simulator as per the fading condition VA 3, which is described in table D.2.2.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.1.4.2 Procedure

1) SS shall start the test by sending data on the MCCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MCCH.

2) SS shall send a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message and wait for the UE to response with a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.1.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests shall not exceed 0.1 for the specified $\frac{\hat{I}_{or}}{I_{oc}}$.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.2 Demodulation of MTCH

10.2.1 Definition and applicability

10.2.1.1 3.84 Mcps TDD Option

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 3,84 Mcps TDD UE.

10.2.1.2 1.28 Mcps TDD Option

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the 1.28Mcps TDD UE that support MBMS.

10.2.1.3 7.68 Mcps TDD Option

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 7,68 Mcps TDD UE.

10.2.2 Minimum requirement

10.2.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 10.2.1 the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.2.2.

Table 10.2.1: Parameters for MTCH detection for 3.84Mcps TDD

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
Σ(S-CCPCH_E_c)/I_{or} per active timeslot	dB	0	0	0	0
MTCH Data Rate	Kbps	128	256	256	256
Propagation condition	-	VA3		Extended Delay Spread (see Table B.1D)	
Number of Radio Links	-	2	3	1	1
S-CCPCH Modulation	-	QPSK	QPKS	16QAM	16QAM
Number of UE Rx Branches	-	1	1	1	2

Table 10.2.2: Test requirements for MTCH detection for 3.84Mcps TDD

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	5.7	0.1
2	5.5	0.1
3	14.5	0.1
4	8.3	0.1

10.2.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 10.2.3 the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.2.4.

Table 10.2.3: Parameters for MTCH detection

Parameters	Unit	Test 1	Test 2
I_{oc}	dBm/1.28 MHz	-60	
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	0	
MTCH Data Rate	kbps	64	128
Number of codes per timeslot	-	8xSF16	14xSF16
Number of interfering codes per timeslot	-	0	0
Propagation condition	-	VA3	
Number of Radio Links	-	3	3

Table 10.2.4: Test requirements for MTCH detection

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	4.8	0.1
2	6.0	0.1

10.2.2.3 7.68 Mcps TDD Option

For the parameters specified in Table 10.2.5 the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.2.6.

Table 10.2.5.: Parameters for MTCH detection for 7.68 Mcps TDD

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/7.68 MHz	-60			
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	-3	-3	-3	-3
MTCH Data Rate	Kbps	128	256	256	256
Number of interfering codes/timeslot	-	16 × SF32	16 × SF32	16 × SF32	16 × SF32
Propagation condition	-	VA3		Extended Delay Spread (see Table B.8)	
Number of Radio Links	-	2	3	1	1
S-CCPCH Modulation	-	QPSK	QPSK	16QAM	16QAM
Number of UE Rx Branches	-	1	1	1	2

Table 10.2.6: Test requirements for MTCH detection for 7.68 Mcps TDD

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	6.1	0.1
2	5.0	0.1
3	14.7	0.1
4	8.2	0.1

10.2.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for each individual data rate of the MTCH channel does not exceed 0.1. The test shall be performed in CELL_PCH state only.

10.2.4 Method of test

10.2.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.16.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.2.

3) The same MTCH data shall be sent in all radio links during the test.

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10 with transition to the CELL_PCH state.

6) Setup the test parameter for MTCH detection test as specified in Table 10.2.1 and 10.2.2 for 3.84 Mcps TDD , Table 10.2.3 and 10.2.4 for 1.28Mcps TDD and Table 10.2.5. and 10.2.6 for 7.68 Mcps TDD. Set up fading simulator as per the fading condition VA3, which is described in table D.2.2.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.2.4.2 Procedure

1) SS shall start the test by sending data on the MTCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MTCH.

2) SS shall send a “UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST” message and wait for the UE to response with a “UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE” reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.2.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests does not exceed 0.1.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.2A Demodulation of MTCH-for MBSFN capable UE

10.2A.1 Definition and applicability

10.2A.1.1 Void

10.2A.1.2 1.28 Mcps TDD Option

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 1.28Mcps TDD UE that support MBSFN.

10.2A.1.3 Void

10.2A.2 Minimum requirement

10.2A.2.1 Void

10.2A.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 10.2A.3A the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.2A.4A.

Table 10.2A.3A: Parameters for MTCH detection

Parameters	Unit	Test 1[1]	Test 2[1]	Test 3[2]	Test 4[2]
MTCH Data rate	Kbps	192	384	192	384
Rx antenna	-	1	2	1	2
Modulation	-	QPSK	16QAM	QPSK	16QAM
I_{oc}	dBm/1.28 MHz	-60	-60	-60	-60
$\sum$(S-CCPCH_E_c)/I_{or}	dB	0	0	0	0
Propagation condition	-	MBSFN channel model 1 (Annex D)	MBSFN channel model 1 (Annex D)	MBSFN channel model 2 (Annex D)	MBSFN channel model 2 (Annex D)
Slot Format #	-	0[4]	2[4]	4[4]	7[4]
NOTE1: Test 1 and Test 2 are specified for the UE supporting normal delay spread. NOTE2: Test 3 and Test 4 are specified for the UE supporting extended delay spread. NOTE3: In the case of Rx diversity, the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated. NOTE4: See Table 8Ha in TS25.221.					

Table 10.2A.4A: Test requirements for MTCH detection

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	13.3	0.1
2	14.7	0.1
3	13.3	0.1
4	15.1	0.1

10.2A.2.3 Void

10.2A.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for each individual data rate of the MTCH channel does not exceed 0.1. The test shall be performed in CELL_PCH state only.

10.2A.4 Method of test

10.2A.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.16.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.2.

3) The same MTCH data shall be sent in all radio links during the test.

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10 with transition to the CELL_PCH state.

6) Setup the test parameter for MTCH detection test as specified in Table 10.2A.3A and 10.2A.4A for 1.28Mcps TDD. Set up fading simulator as per the fading condition, which is described in table D.2.2.2.3.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.2A.4.2 Procedure

1) SS shall start the test by sending data on the MTCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MTCH.

2) SS shall send a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message and wait for the UE to response with a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.2A.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests does not exceed 0.1.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.3 Demodulation of MTCH and cell identification

10.3.1 1.28Mcps TDD option

10.3.1.1 Definition and applicability

MBMS combining is not controlled by a network but instead it is autonomously handled by a terminal. UE has to be able to receive MTCH and identify intra-frequency neighbour cells according to the requirements. The receive characteristic of the MTCH combined with cell identification is determined by RLC SDU error rate (RLC SDU ER).

The requirements and this test apply to Release 6 and later releases for1.28Mcps TDD UE that supports MBMS.

10.3.1.2 Minimum requirements

For the parameters specified in Table 10.3.1.1 the average downlink S-CCPCH $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU error rate shown in Table 10.3.1.2. The cell reselection parameters are given in clause in Table 10.3.1.3. The different cells are assumed to be time aligned.

Table 10.3.1.1: Parameters for MTCH demodulation requirements with cell identification

Parameter	Unit	Test 1		
		Stage 1	Stage 2	Stage 3
Time in each stage	s	2s	800ms	2s
I_{oc}	dBm/1.28MHz	-60		
Propagation condition		VA 3		
MTCH Data Rate	kbps	64kbps		
Number of Radio Links		Cell 1, Cell 2	Cell 1, Cell2, Cell3	Cell 1, Cell 3

Table 10.3.1.2: Requirements for MTCH detection

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$	RLC SDU ER
1	6.1	0.05

Parameters for combined MTCH demodulation and cell identification requirements are defined in Table 10.3.1.3.

Table 10.3.1.3: Cell reselection parameters

Parameter	Unit	Value
Serving cell in the initial condition		Cell1
Neighbour cells		32 intra-frequency neighbour cells are indicated including Cell2 and Cell3
Cell_selection_and_reselection_quality_measure		PCCPCH RSCP
Qrxlevmin	dBm	-103
UE_TXPWR_MAX_RACH	dB	21
Treselection	Seconds	4
Sintrasearch	dB	not sent
IE “FACH Measurement occasion info”		not sent

The reference for this requirement is TS 25.102 [1] clause 10.3.1 and TS 25.102 [1] annex A.4.2.2.

10.3.1.3 Test purpose

To verify that the RLC SDU error rate does not exceed the value at the S-CCPCH $\frac{\hat{I}_{or}}{I_{oc}}$ r specified in table 10.3.1.2.

10.3.1.4 Method of test

10.3.1.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulators to the UE antenna connector as shown in Figure A.16.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.1.2

3) The same MTCH data shall be sent in all active cells during the test.

4) The UE is switched on.

5) The UE selects the broadcast service provided by the SS (included in the MBMS_ACTIVATED_SERVICES variable).

6) Set up a call according to the generic call setup procedure specified in TS 34.108 [3] clause 7.3.10 to configure and activate an MBMS session with transition to CELL_PCH state. The SS broadcast the cell reselection parameters according to table 10.3.1.3.

10.3.1.4.2 Procedures

1) The SS configures and activates cell 1 to 3 with RF parameters according to Stage 1 conditions in Table 10.3.1.1.

2) The SS transmits valid MAC headers and RLC SDUs on the MTCH radio bearer for 2 seconds. The SS counts the number of transmitted RLC SDUs on the MTCH with valid MAC headers (N_{SS_Stage1}).

3) The SS transmits invalid MAC headers sets the test parameters for Cell 1, Cell 2 and Cell 3 as specified in table 10.3.1.1 and Stage 2.

4) The SS transmits valid MAC headers and RLC SDUs on the MTCH radio bearer for 0.8 seconds. The SS counts the number of transmitted RLC SDUs on the MTCH with valid MAC headers (N_{SS_Stage2}).

5) The SS transmits invalid MAC headers sets the test parameters for Cell 1, Cell 2 and Cell 3 as specified in table 10.3.1.1 and Stage 3.

6) The SS transmits valid MAC headers and RLC SDUs on the MTCH radio bearer for 2 seconds. The SS counts the number of transmitted RLC SDUs on the MTCH with valid MAC headers (N_{SS_Stage3}).

7) Repeat step 9) to 14) until the confidence level for RLC SDU's according to annex F.6.1.8.

8) The SS transmits a PAGING TYPE 1 message to the UE on the PCH and the UE moves to CELL_FACH state, sending a CELL UPDATE message. The SS replies with a CELL UPDATE CONFIRM message.

9) The UE confirms the received C-RNTI to be used in CELL FACH state by transmitting a UTRAN MOBILITY INFORMATION CONFIRM message on the uplink DCCH.

10) The SS sends a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message.

11) The SS waits for the UE to respond by a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" message reporting the number of received RLC SDUs on MTCH (N_{UEOK}).

12) The SS in Cell 1 calculates the SDU error rate as: (Number of SS transmitted RLC SDUs – UE received RLC SDUs) / Number of SS transmitted RLC SDUs; where Number of SS transmitted RLC SDUs = $N_{SS\_Stage1} + N_{SS\_Stage2} + N_{SS\_Stage3}$; and UE received RLC SDUs = N_{UEOK}.

13) End the RRC connection according to the generic call setup procedure specified in TS 34.108 [3] clause 7.3.10.

Specific Message Contents

All messages indicated above shall use the same content as described in the default message content in clause 9 of 34.108 [3].

10.3.1.5 Test requirements

The test parameters are specified in table 10.3.1.4.

Table 10.3.1.4: Parameters for MTCH demodulation requirements with cell identification

Parameter	Unit	Test 1		
		Stage 1	Stage 2	Stage 3
Time in each stage	s	2s	800ms	2s
I_{oc}	dBm/1.28MHz	-60		
Propagation condition		VA 3		
MTCH Data Rate	kbps	64kbps		
Number of Radio Links		Cell 1, Cell 2	Cell 1, Cell2, Cell3	Cell 1, Cell 3

The RLC SDU ER shall not exceed the value specified in table 10.3.1.5 for the specified $\frac{\hat{I}_{or}}{I_{oc}}$

Table 10.3.1.5: Requirements for MTCH detection

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$	RLC SDU ER
1	6.1	0.05

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4.

10.4 Demodulation of MCCH for a MBSFN capable UE

10.4.1 Definition and applicability

10.4.1.1 3.84 Mcps TDD Option

The test is only applicable for UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MCCH is determined by the RLC SDU error rate (RLC_SDU_ER). The requirement is valid for all RRC states for which the UE has capabilities.

The requirements and this test apply to the 3,84 Mcps TDD UE.

10.4.1.2 7.68 Mcps TDD Option

The test is only applicable for UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MCCH is determined by the RLC SDU error rate (RLC_SDU_ER). The requirement is valid for all RRC states for which the UE has capabilities.

The requirements and this test apply to the 7,68 Mcps TDD UE.

10.1.2 Minimum requirement

10.1.4.1 3.84 Mcps TDD Option

For the parameters specified in table 10.4.1, the measured average downlink S-CCPCH_E_c/I_{or} power ratio shall be below the specified value for the RLC_SDU_ER shown in table 10.4.2.

Table 10.4.1: Test parameters for MCCH detection for MBSFN enabled UE

Parameters	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	12
Number of Interfering codes/timeslot	-	7 × SF16
MCCH Data Rate	kbps	7.2
Propagation condition	-	Extended delay spread (see Appendix B)
Slot Format #i	-	20

Table 10.4.2: Test requirements for MCCH detection (at least two receiver antennas) for MBSFN enabled UE

Test Number	S-CCPCH_Ec/Ior (dB)	RLC_SDU_ER
1	-19.29	0.01

10.4.2.2 7.68 Mcps TDD Option

For the parameters specified in table 10.4.3, the measured average downlink S-CCPCH_E_c/I_{or} power ratio shall be below the specified value for the RLC_SDU_ER shown in table 10.4.4.

Table 10.4.3: Test parameters for MCCH detection for MBSFN enabled UE

Parameters	Unit	Test 1
I_{oc}	dBm/7.68 MHz	-60
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	12
Number of Interfering codes/timeslot	-	15 × SF32
MCCH Data Rate	kbps	7.2
Propagation condition	-	Extended delay spread (see Appendix B)
Slot Format #i	-	20

Table 10.4.4: Test requirements for MCCH detection (at least two receiver antennas) for MBSFN enabled UE

Test Number	S-CCPCH_Ec/Ior (dB)	RLC_SDU_ER
1	-22.71	0.01

10.4.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for the MCCH channel does not exceed 0.01.

10.4.4 Method of test

10.4.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.17.

2) The MCCH Reference Measurement Channel parameters are defined in Annex C.5.1.

3) The configuration for the downlink channel for each radio link is defined in Annex E.

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10.

6) Setup the test parameter for MCCH detection test as specified in Table 10.4.1 and 10.4.2 for 3.84 Mcps TDD and Table 10.4.3. and 10.4.4 for 7.68 Mcps TDD. Set up fading simulator as per the fading condition EDS, which is described in table D.2.2.1B for 3.84Mcps and table D.2.2.3.5 for 3.84Mcps.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.4.4.2 Procedure

1) SS shall start the test by sending data on the MCCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MCCH.

2) SS shall send a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message and wait for the UE to response with a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.4.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests shall not exceed 0.1 for the specified S-CCPCH_E_c/I_{or} power ratio.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.5 Demodulation of MTCH for a MBSFN capable UE

10.5.1 Definition and applicability

10.5.1.1 3.84 Mcps TDD Option

The test is only applicable for UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 3,84 Mcps TDD UE.

10.2.1.2 7.68 Mcps TDD Option

The test is only applicable for UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 7,68 Mcps TDD UE.

10.5.2 Minimum requirement

10.5.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 10.5.1 the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.5.2.

Table 10.5.1: Parameters for MTCH detection for 3.84Mcps TDD for MBSFN capable UE

Parameters	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	0
MTCH Data Rate	kbps	512
Propagation condition	-	Extended delay spread (see Appendix B)
Number of Radio Links	-	1
S-CCPCH Modulation	-	16QAM

Table 10.5.2: Test requirements for MTCH detection for 3.84Mcps TDD for MBSFN capable UE (at least two receiver antennas)

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	14.58	0.1

10.5.2.2 7.68 Mcps TDD Option

For the parameters specified in Table 10.5.3 the average downlink $\frac{\hat{I}_{or}}{I_{oc}}$ power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.5.4.

Table 10.5.3.: Parameters for MTCH detection for 7.68 Mcps TDD

Parameters	Unit	Test 1
I_{oc}	dBm/7.68 MHz	-60
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	-3
MTCH Data Rate	kbps	512
Number of interfering codes/timeslot	-	16 × SF32
Propagation condition	-	Extended delay spread (see Appendix B)
Number of Radio Links	-	1
S-CCPCH Modulation	-	16QAM

Table 10.5.4: Test requirements for MTCH detection for 7.68 Mcps TDD

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ (dB)	RLC SDU ER
1	14.21	0.1

10.5.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for each indiv idual data rate of the MTCH channel does not exceed 0.1. The test shall be performed in CELL_PCH state only.

10.5.4 Method of test

10.5.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.17.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.2.

3) The configuration for the downlink channel for each radio link is defined in Annex.E..

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10 with transition to the CELL_PCH state.

6) Setup the test parameter for MTCH detection test as specified in Table 10.5.1 and 10.5.2 for 3.84 Mcps TDD , and Table 10.5.5. and 10.5.6 for 7.68 Mcps TDD. Set up fading simulator as per the fading condition EDS, which is described in table D.2.2.1B for 3.84Mcps and table D.2.2.3.5 for 3.84Mcps.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.2.4.2 Procedure

1) SS shall start the test by sending data on the MTCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MTCH.

2) SS shall send a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message and wait for the UE to response with a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.5.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests does not exceed 0.1.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.5A Demodulation of MTCH for a IMB capable UE

10.5A.1 Definition and applicability

The test is only applicable for UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

10.5A.2 Minimum requirement

For the parameters specified in Table 10.5A.1a the measured average downlink S-CCPCH_E_c/I_{or} power ratio shall be below the specified value for the RLC SDU ER shown in Table 10.5A.2a.

Table 10.5A.1a: Parameters for MTCH detection

Parameters	Unit	Test 1
I_{oc}	dBm/3.84MHz	-60
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	12
MTCH Data Rate	kbps	512 (see Annex C)
Propagation condition	-	Extended Delay Spread (see Annex D)

Table 10.5A.2a: Test requirements for MTCH detection (at least two receiver antennas)

Test Number	S-CCPCH_Ec/Ior (dB)	RLC SDU ER
1	-3.5	0.1

10.5A.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for each individual data rate of the MTCH channel does not exceed 0.1.

10.5A.4 Method of test

10.5A.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.17.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.2.

3) The configuration for the downlink channel for each radio link is defined in Annex E..

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10 with transition to the CELL_PCH state.

6) Setup the test parameter for MTCH detection test as specified in Table 10.5A.1a and 10.5A.2a for 3.84 Mcps TDD IMB. Set up fading simulator as per the fading condition EDS, which is described in table D.2.2.1B for 3.84Mcps.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Switch on the fading simulator.

10.5A.4.2 Procedure

1) SS shall start the test by sending data on the MTCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MTCH.

2) SS shall send a "UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST" message and wait for the UE to response with a "UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE" reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.5A.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests does not exceed 0.1.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

10.6 MBSFN TDD and FDD same platform sharing

10.6.1 Definition and applicability

10.6.1.1 3.84 Mcps TDD Option

This test case is to ensure that a simultaneous demodulation of MTCH and FDD transmission is possible for a MBSFN TDD UE sharing the same platform with a FDD UE. The test is only applicable for TDD UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 3,84 Mcps TDD (non-IMB) UE.

10.6.1.2 7.68 Mcps TDD Option

This test case is to ensure that a simultaneous demodulation of MTCH and FDD transmission is possible for a MBSFN TDD UE sharing the same platform with a FDD UE. The test is only applicable for TDD UEs with at least two receiver antenna connectors where the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated.

The receive characteristic of the MTCH is determined by RLC SDU error rate (RLC SDU ER). RLC SDU ER is specified for each individual data rate of the MTCH. The requirement is valid for all RRC states for which the UE has capabilities for MBMS.

The requirements and this test apply to the 7,68 Mcps TDD UE.

10.6.2 Minimum requirement

10.6.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 10.6.1 the average downlink $\hat{I}_{or}$ power shall be below the specified value for the RLC SDU ER shown in Table 10.6.2.

Table 10.6.1: Parameters for MTCH detection sharing same platform with FDD for 3.84Mcps TDD

Parameters	Unit	Test 1	Test 2
FDD UE Tx Pwr	dBm/ 3.84 MHz	Nominal Maximum Output Power	Nominal Maximum Output Power
I_{oc}	dBm/ 3.84 MHz	-infinity	-infinity
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	0	0
MTCH Data Rate	kbps	512	512
Number of interfering codes/timeslot	-	0	0
Propagation condition	-	Extended Delay Spread (see Appendix B)	Extended Delay Spread (see Appendix B)
Number of Radio Links	-	1	1
S-CCPCH Modulation	-	16QAM	16QAM
TDD operating frequencies	MHz	1900-1920	2570-2620
FDD operating band	-	Band I	Band VII
TDD/FDD carrier frequencies	-	Applicable for all combinations of TDD and FDD carrier frequencies except for combinations where the carrier frequency separation is less than 15 MHz	Applicable for all combinations of TDD and FDD carrier frequencies except for combinations where the carrier frequency separation is less than 15 MHz

Table 10.6.2: Test requirements for MTCH detection sharing same platform with FDD for 3.84Mcps TDD UE (at least two receiver antennas)

Test Number	$\hat{I}_{or}$ (dBm)	RLC SDU ER
1	-83.42	0.1
2	-83.42	0.1

10.6.2.3 7.68 Mcps TDD Option

For the parameters specified in Table 10.6.3 the average downlink $\hat{I}_{or}$ power shall be below the specified value for the RLC SDU ER shown in Table 10.6.4.

Table 10.6.3: Parameters for MTCH detection sharing same platform with FDD for 7.68Mcps TDD

Parameters	Unit	Test 1	Test 2
FDD UE Tx Pwr	dBm/ 3.84 MHz	Nominal Maximum Output Power	Nominal Maximum Output Power
I_{oc}	dBm/ 7.68 MHz	-infinity	-infinity
$\sum$(S-CCPCH_E_c)/I_{or} per active timeslot	dB	-3	-3
MTCH Data Rate	kbps	512	512
Number of interfering codes/timeslot	-	16 × SF32	16 × SF32
Propagation condition	-	Extended Delay Spread (see Appendix B)	Extended Delay Spread (see Appendix B)
Number of Radio Links	-	1	1
S-CCPCH Modulation	-	16QAM	16QAM
TDD operating frequencies	MHz	1900-1920	2570-2620
FDD operating band	-	Band I	Band VII
TDD/FDD carrier frequencies	-	Applicable for all combinations of TDD and FDD carrier frequencies except for combinations where the carrier frequency separation is less than 17.5 MHz	Applicable for all combinations of TDD and FDD carrier frequencies except for combinations where the carrier frequency separation is less than 17.5 MHz

Table 10.6.4: Test requirements for MTCH detection sharing same platform with FDD for 3.84Mcps TDD UE (at least two receiver antennas)

Test Number	$\hat{I}_{or}$ (dBm)	RLC SDU ER
1	-80.79	0.1
2	-80.79	0.1

10.6.3 Test Purpose

The aim of the test is to verify that the RLC SDU error rate (RLC SDU ER) for each individual data rate of the MTCH channel does not exceed 0.1. The test shall be performed in CELL_PCH state only.

10.6.4 Method of test

10.6.4.1 Initial conditions

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in Figure A.17.

2) The DL Reference Measurement Channel parameters are defined in Annex C.5.2.

3) The configuration for the downlink channel for each radio link is defined in Annex.E..

4) The UE is switched on.

5) Set up a call according to the generic call setup procedure in TS34.108 [3] clause 7.3.10 with transition to the CELL_PCH state.

6) Setup the test parameter for MTCH detection test as specified in Table 10.5.1 and 10.5.2 for 3.84 Mcps TDD , and Table 10.5.5. and 10.5.6 for 7.68 Mcps TDD. Set up fading simulator as per the fading condition EDS, which is described in table D.2.2.1B for 3.84Mcps and table D.2.2.3.5 for 3.84Mcps.

7) Enter the UE into loopback test mode 3. See TS 34.108 and TS 34.109 for details regarding loopback test mode 3 for MBMS.

8) Use the SS to ensure that the UE is transmitting an FDD signal as defined in table 10.6.1 for 3.84Mcps TDD and table 10.6.3 for 7.68Mcps TDD.

9) Switch on the fading simulator.

10.6.4.2 Procedure

1) SS shall start the test by sending data on the MTCH radio bearer and maintain the count of transmitted RLC SDU blocks on the MTCH.

2) SS shall send a “UE TEST LOOP MODE 3 RLC SDU COUNTER REQUEST” message and wait for the UE to response with a “UE TEST LOOP MODE 3 RLC SDU COUNTER RESPONSE” reporting the received RLC SDU counter value.

3) SS shall compute the RLC SDU error rate based on the transmitted RLC SDUs count and received RLC SDU count reported by the UE.

4) The test shall be run until the statistical significance according to Annex to F.6.1.8 is achieved.

10.6.5 Test Requirements

The RLC SDU error rate (RLC SDU ER) for all the MTCH demodulation tests does not exceed 0.1.

The RLC SDU error rate = the ratio of (transmitted RLC SDU count – received RLC SDU count) / (transmitted RLC SDU count) < 0.1

11 Performance requirement (E-DCH)

11.1 Detection of E-DCH HARQ ACK Indicator Channel (E-HICH)

11.1.1 Definition and applicability

11.1.1.1 3.84 Mcps TDD Option

The performance of the E-HICH detection is determined by the false ACK probability (probability of detecting an ACK given that a NACK was sent) and the false NACK probability (probability of detecting a NACK given that an ACK was sent).

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 3.84 Mcps TDD UE that support HSDPA and E-DCH.

11.1.1.2 1.28 Mcps TDD Option

The performance of the E-HICH detection is determined by the false ACK probability (probability of detecting an ACK given that a NACK was sent) and the false NACK probability (probability of detecting a NACK given that an ACK was sent).

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 1.28 Mcps TDD UE that support HSDPA and E-DCH.

11.1.1.3 7.68 Mcps TDD Option

The performance of the E-HICH detection is determined by the false ACK probability (probability of detecting an ACK given that a NACK was sent) and the false NACK probability (probability of detecting a NACK given that an ACK was sent).

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 7.68 Mcps TDD UE that support HSDPA and E-DCH.

11.1.2 Minimum requirement

11.1.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 11.1.1 the average downlink E-HICH E_c/I_{or} power ratio shall be below the specified value for the false ACK and false NACK probabilities shown in Table 11.1.2.

Table 11.1.1: Test parameters for E-HICH detection (3.84 Mcps TDD option)

Parameters	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	0	
Number of Interfering codes/timeslot	-	7 × SF16 (all codes have equal powers)	
E-HICH signalling pattern	-	100% NACK	100% ACK
Propagation condition	-	VA30	

Table 11.1.2: Test requirements for E-HICH detection (3.84 Mcps TDD option)

Test Number	E-HICH Ec/Ior (dB)	Parameter	Probability
1	-18.5	False ACK	2E-3
2	-18.5	False NACK	2E-2

11.1.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 11.1.3 the average downlink E-HICH E_c/I_{or} power ratio shall be below the specified value for the false ACK and false NACK probabilities shown in Table 11.1.4.

Table 11.1.3: Test parameters for E-HICH detection (1.28 Mcps TDD option)

Parameters	Unit	Test 1	Test 2
I_{oc}	dBm/1.28 MHz	-60	
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	0	
Number of Interfering codes/timeslot	-	7 × SF16 (all codes have equal powers)	
E-HICH signalling pattern	-	100% NACK	100% ACK
Propagation condition	-	VA30	

Table 11.1.4: Test requirements for E-HICH detection (1.28 Mcps TDD option)

Test Number	E-HICH Ec/Ior (dB)	Parameter	Probability
1	-7.5	False ACK	2E-3
2	-7.5	False NACK	2E-2

11.1.2.3 7.68 Mcps TDD Option

For the parameters specified in Table 11.3 the average downlink E-HICH E_c/I_{or} power ratio shall be below the specified value for the false ACK and false NACK probabilities shown in Table 11.4.

Table 11.1.5: Test parameters for E-HICH detection (7.68 Mcps TDD option)

Parameters	Unit	Test 1	Test 2
I_{oc}	dBm/7.68 MHz	-60	
$\frac{\hat{I}_{or}}{I_{oc}}$	dB	0	
Number of Interfering codes/timeslot	-	15 × SF32 (all codes have equal powers)	
E-HICH signalling pattern	-	100% NACK	100% ACK
Propagation condition	-	VA30	

Table 11.1.6: Test requirements for E-HICH detection (7.68 Mcps TDD option)

Test Number	E-HICH Ec/Ior (dB)	Parameter	Probability
1	-21.7	False ACK	2E-3
2	-21.7	False NACK	2E-2

11.1.3 Test Purpose

The test verifies that the false ACK probability and false NACK probability of E-HICH meet the requirement.

11.1.4 Method of test

11.1.4.1 Initial conditions

11.1.4.1.1 3.84Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the false ACK test and the false NACK test as specified in table 11.1.1.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.1 and DL Reference Measurement Channel parameters are defined in Annex C4.1.1.1

4) The value of TRRI shall be set to '111111' and CRRI on E-AGCH shall be set to 15. Note that the radio bearer reconfiguration message used to conifigure the UE will define 6 E-PUCH TS and therefore the length of the TRRI will be 6 bits.

5) The value of PRRI is set to 31. This ensures that the UL datarate remains constant.

6) The UE is switched on.

7) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

8) Switch on the fading simulator.

11.1.4.1.2 1.28Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the false ACK test and the false NACK test as specified in 11.1.3 for 1.28Mcps TDD option.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.2 and DL Reference Measurement Channel parameters are defined in Annex C4.2.1.1

4) The value of TRRI shall be set to '11000' and CRRI on E-AGCH shall be set to 3.

5) The value of PRRI is same. This ensures that the UL datarate remains constant.

6) The UE is switched on.

7) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

8) Switch on the fading simulator.

11.1.4.1.3 7.68Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the false ACK test and the false NACK test as specified in table 11.1.1.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.3 and DL Reference Measurement Channel parameters are defined in Annex C4.2A.1.1

4) The value of TRRI shall be set to '111111' and CRRI on E-AGCH shall be set to 31. Note that the radio bearer reconfiguration message used to conifigure the UE will define 6 E-PUCH TS and therefore the length of the TRRI will be 6 bits.

5) The value of PRRI is set to 31. This ensures that the UL datarate remains constant.

6) The UE is switched on.

7) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

8) Switch on the fading simulator.

11.1.4.2 3.84Mcps TDD Option

The measurement principle for the false ACK test (step 2 to 5) and for the false NACK test (step 6 to 9) is as follows. Upon the UE transmission on E-UCCH and E-PUCH, the SS reacts with E-HICH = ACK or NACK. The UE transmits new data or retransmissions on the corresponding E-UCCH and E-PUCH. The SS shall discriminate between:

(1) new data is a sign for ACK, received by the UE

(2) retransmission is a sign for NACK, received by the UE . The later is interpreted as NACK by higher layer and causes retransmission.

1. The Nominal Avg. Information Bit Rate in the DL is set to 2649.6kbps according to Annex C4.1.1.1. The expected througput under this level and fading conditions is 1300 kbps. The UL datarate was configured by signalling TRRI=111111 and CRRI=15 on the E-AGCH. The expected UL datarate is 34.7 kbps corresponding to E-TFC Index 46.

2. In the test false ACK the SS responds with 100% ACK.

3. If the UE indicates on the E-UCCH a retransmission, the ACK from the SS was received as NACK by the UE. This is counted as false(ACK).

   If the UE indicates on the E-UCCH new data, the ACK from the SS was received as ACK by the UE. This is counted as correct ACK.

4. Continue until statistical significance according to Annex F.6.4 is achieved.

5. If the number of retransmissions reaches the maximum number of retransmissions due to several false ACK detections in series, the first new data on the E-PUCH with E-UCCH are not the consequence of ACK. This case is not counted as sample.

6. In the test false NACK the SS responds with 100% NACK.

7. If the UE indicates on the E-UCCH new data, the NACK from the SS was received as ACK by the UE. This is counted as false(NACK). If the UE indicates on E-UCCH retransmission, the NACK from the SS was received as NACK by the UE. This is counted as correct reception.

8. Continue until statistical significance according to Annex F.6.4 is achieved.

9. The number of retransmissions will reach the maximum number of transmissions due to several retransmissions in series. The first new data on the E-PUCH with E-UCCH are not the consequence of ACK received by the UE. This case is not counted as sample.

11.1.4.2.2 1.28Mcps TDD Option

The measurement principle for the false ACK test (step 2 to 5) and for the false NACK test (step 6 to 9) is as follows. Upon the UE transmission on E-UCCH and E-PUCH, the SS reacts with E-HICH = ACK or NACK. The UE transmits new data or retransmissions on the corresponding E-UCCH and E-PUCH. The SS shall discriminate between:

(1) new data is a sign for ACK, received by the UE

(2) retransmission is a sign for NACK, received by the UE . The later is interpreted as NACK by higher layer and causes retransmission.

. 1. The Nominal Avg. Information Bit Rate in the DL is set to 199.2 kbps according to FRC1in Annex C4.2.1.1. The expected througput under this level and fading conditions is 161 kbps. The UL datarate was configured by signalling TRRI=11000 and CRRI=3 on the E-AGCH. The expected UL datarate is 57.4 kbps corresponding to E-TFC Index 56.

2. In the test false ACK the SS responds with 100% ACK.

3. If the UE indicates on the E-UCCH a retransmission, the ACK from the SS was received as NACK by the UE. This is counted as false(ACK).

   If the UE indicates on the E-UCCH new data, the ACK from the SS was received as ACK by the UE. This is counted as correct ACK.

4. Continue until statistical significance according to Annex F.6.4 is achieved.

5. If the number of retransmissions reaches the maximum number of retransmissions due to several false ACK detections in series, the first new data on the E-PUCH with E-UCCH are not the consequence of ACK. This case is not counted as sample.

6. In the test false NACK the SS responds with 100% NACK.

7. If the UE indicates on the E-UCCH new data, the NACK from the SS was received as ACK by the UE. This is counted as false(NACK). If the UE indicates on E-UCCH retransmission, the NACK from the SS was received as NACK by the UE. This is counted as correct reception.

8. Continue until statistical significance according to Annex F.6.4 is achieved.

9. The number of retransmissions will reach the maximum number of transmissions due to several retransmissions in series. The first new data on the E-PUCH with E-UCCH are not the consequence of ACK received by the UE. This case is not counted as sample.

11.1.4.2.3 7.68Mcps TDD Option

The measurement principle for the false ACK test (step 2 to 5) and for the false NACK test (step 6 to 9) is as follows. Upon the UE transmission on E-UCCH and E-PUCH, the SS reacts with E-HICH = ACK or NACK. The UE transmits new data or retransmissions on the corresponding E-UCCH and E-PUCH. The SS shall discriminate between:

(1) new data is a sign for ACK, received by the UE

(2) retransmission is a sign for NACK, received by the UE . The later is interpreted as NACK by higher layer and causes retransmission.

. 1. The Nominal Avg. Information Bit Rate in the DL is set to 1761.2kbps according to Annex C4.2A.1.1. The expected througput under this level and fading conditions is 880 kbps. The UL datarate was configured by signalling TRRI=111111 and CRRI=15 on the E-AGCH. The expected UL datarate is 35.9 kbps corresponding to E-TFC Index 41.

2. In the test false ACK the SS responds with 100% ACK.

3. If the UE indicates on the E-UCCH a retransmission, the ACK from the SS was received as NACK by the UE. This is counted as false(ACK).

   If the UE indicates on the E-UCCH new data, the ACK from the SS was received as ACK by the UE. This is counted as correct ACK.

4. Continue until statistical significance according to Annex F.6.4 is achieved.

5. If the number of retransmissions reaches the maximum number of retransmissions due to several false ACK detections in series, the first new data on the E-PUCH with E-UCCH are not the consequence of ACK. This case is not counted as sample.

6. In the test false NACK the SS responds with 100% NACK.

7. If the UE indicates on the E-UCCH new data, the NACK from the SS was received as ACK by the UE. This is counted as false(NACK). If the UE indicates on E-UCCH retransmission, the NACK from the SS was received as NACK by the UE. This is counted as correct reception.

8. Continue until statistical significance according to Annex F.6.4 is achieved.

9. The number of retransmissions will reach the maximum number of transmissions due to several retransmissions in series. The first new data on the E-PUCH with E-UCCH are not the consequence of ACK received by the UE. This case is not counted as sample.

11.1.5 Test Requirements

The false ACK and false NACK detection probability shall not exceed to the values specified in Table 11.1.2 for 3.84 Mcps TDD option, 11.1.4 for 1.28Mcps TDD option and Table 11.1.6 for 7.68 Mcps TDD option.

11.2 Demodulation of E-DCH Absolute Grant Channel (E-AGCH)

11.2.1 Definition and applicability

11.2.2.1 3.84 Mcps TDD Option

The performance of the E-AGCH detection is determined by the missed detection probability.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 3.84 Mcps TDD UE that support HSDPA and E-DCH.

11.2.2.2 1.28 Mcps TDD Option

The performance of the E-AGCH detection is determined by the missed detection probability.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 1.28 Mcps TDD UE that support HSDPA and E-DCH.

11.2.2.3 7.68 Mcps TDD Option

The performance of the E-AGCH detection is determined by the missed detection probability.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the 7.68 Mcps TDD UE that support HSDPA and E-DCH.

11.2.2 Minimum requirement

11.2.2.1 3.84 Mcps TDD Option

For the parameters specified in Table 11.2.1 the average downlink E-AGCH $\hat{I}_{or}/I_{oc}$ power ratio shall be below the specified value for the missed detection probability shown in Table 11.2.2.

Table 11.2.1: Test parameters for E-AGCH detection (3.84 Mcps TDD option)

Parameters	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
$\frac{E_c}{I_{or}}$	dB	-6.02
Number of Interfering codes/timeslot	-	3 × SF16
Total bits in Timeslot Resource Related Information (TRRI)	bits	6
Total bits in Resource Duration Indicator (RDI)	bits	3
Total bits in E-AGCH	bits	38
Propagation condition	-	VA30

Table 11.2.2: Test requirements for E-AGCH detection (3.84 Mcps TDD option)

Test Number	E-AGCH $\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	1.6	0.01

11.2.2.2 1.28Mcps TDD Option

For the parameters specified in Table 11.2.3 the average downlink $\hat{I}_{or}/I_{oc}$ power ratio shall be below the specified value for the missed detection probability shown in Table 11.2.4.

Table 11.2.3: Test parameters for E-AGCH detection (1.28 Mcps TDD option)

Parameters	Unit	Test 1
I_{oc}	dBm/1.28 MHz	-60
$\frac{\text{E-AGCH\_}E_c}{I_{or}}$	dB	-3
Number of Interfering codes/timeslot	-	2 × SF16
Total bits in Timeslot Resource Related Information (TRRI)	bits	5
Total bits in Resource Duration Indicator (RDI)	bits	3
Total bits in E-AGCH	bits	26
Propagation condition	-	VA30

Table 11.2.4: Test requirements for E-AGCH detection (1.28 Mcps TDD option)

Test Number	$\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	8	0.01

11.2.2.3 7.68 Mcps TDD Option

For the parameters specified in Table 11.2.5 the average downlink E-AGCH $\hat{I}_{or}/I_{oc}$ power ratio shall be below the specified value for the missed detection probability shown in Table 11.2.6.

Table 11.2.5: Test parameters for E-AGCH detection (7.68 Mcps TDD option)

Parameters	Unit	Test 1
I_{oc}	dBm/7.68 MHz	-60
$\frac{E_c}{I_{or}}$	dB	-9.03
Number of Interfering codes/timeslot	-	7 × SF32
Total bits in Timeslot Resource Related Information (TRRI)	bits	6
Total bits in Resource Duration Indicator (RDI)	bits	3
Total bits in E-AGCH	bits	39
Propagation condition	-	VA30

Table 11.2.6: Test requirements for E-AGCH detection (7.68 Mcps TDD option)

Test Number	E-AGCH $\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	1.2	0.01

11.2.3 Test Purpose

The aim of the test is to verify that the missed detection probability of the E-AGCH channel does not exceed 0.01.

11.2.4 Method of test

11.2.4.1 Initial conditions

11.2.4.1.1 3.84Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the miss detection E-AGCH test as specified in table 11.2.1.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.1 and DL Reference Measurement Channel parameters are defined in Annex C4.1.1.1

4) The value of TRRI shall be set to '111111' and CRRI on E-AGCH shall be set to 15.

5) The UE is switched on.

6) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

7) Switch on the fading simulator.

11.2.4.1.2 1.28Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the miss detection E-AGCH test as specified in 11.2.3 for 1.28Mcps TDD option.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.2 and DL Reference Measurement Channel parameters are defined in Annex C4.2.1.1

4) The value of TRRI shall be set to '11000' and CRRI on E-AGCH shall be set to 3.

5) The UE is switched on.

6) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

7) Switch on the fading simulator.

11.2.4.1.3 7.68Mcps TDD Option

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS and AWGN noise source and fading simulator to the UE antenna connector as shown in figure Figure A.10.

2) Set the test parameters for the miss detection E-AGCH test as specified in table 11.2.1.

3) The UL Reference Measurement Channel parameters are defined in Annex C.6.1.3 and DL Reference Measurement Channel parameters are defined in Annex C4.2A.1.1

4) The value of TRRI shall be set to '111111' and CRRI on E-AGCH shall be set to 31.

5) The UE is switched on.

6) Enter the UE into loopback mode 1, looping back both the 12.2kbps RMC and HSDPA to E-DCH, and start the loopback test. See TS 34.108 [3] clause 7.3.9 and TS 34.109 [4] clauses 5.3.2.3 and 5.3.2.6. To fill the RLC transmit buffer, run the loopback for [3]s before starting the procedure.

7) Switch on the fading simulator.

11.2.4.2 Procedure

11.2.4.2.1 3.84Mcps TDD Option

1) The SS shall signal 100% ACK on the E-HICH for all processes.

2) The SS shall signal the PRRI according to the E-AGCH information sequence as defined in Table 11.2.4.6A.

3) The SS shall analyse the E-TFCI transmitted on the E-UCCH for each E-DCH TTI to determine if a missed detection event has occurred by correlating the detected E-TFCIs with the expected E-TFCIs corresponding to the PRRI sent on E-AGCH when the TRRI and CRRI is constant. If the expected E-TFC is not detected by the SS, record a missed detection event.

4) The test shall be run such that statistical significance according to Annex F.6.4 is achieved.

11.2.4.2.2 1.28Mcps TDD Option

1) The SS shall signal 100% ACK on the E-HICH for all processes.

2) The SS shall signal the PRRI according to the E-AGCH information sequence as defined in Table 11.2.4.7.

3) The SS shall analyse the E-TFCI transmitted on the E-UCCH for each E-DCH TTI to determine if a missed detection event has occurred by correlating the detected E-TFCIs with the expected E-TFCIs corresponding to the PRRI sent on E-AGCH when the TRRI and CRRI is constant. If the expected E-TFC is not detected by the SS, record a missed detection event.

4) The test shall be run such that statistical significance according to Annex F.6.4 is achieved

11.2.4.2.3 7.68Mcps TDD Option

1) The SS shall signal 100% ACK on the E-HICH for all processes.

2) The SS shall signal the PRRI according to the E-AGCH information sequence as defined in Table 11.2.4.9.

3) The SS shall analyse the E-TFCI transmitted on the E-UCCH for each E-DCH TTI to determine if a missed detection event has occurred by correlating the detected E-TFCIs with the expected E-TFCIs corresponding to the PRRI sent on E-AGCH when the TRRI and CRRI is constant. If the expected E-TFC is not detected by the SS, record a missed detection event.

4) The test shall be run such that statistical significance according to Annex F.6.4 is achieved

11.2.5 Test Requirements

11.2.5.1 3.84Mcps TDD Option

The missed detection probability shall not exceed to the values specified in Table 11. 2.4.6B for 3.84 Mcps TDD.

The missed detection probability = the ratio of (missed detection event)/ (all detected E-TFCI event) ≤ 0.01.

Tables 11.2.4.6A and 11.2.4.6B define the primary level settings including test tolerance and test parameters for the test.

Table 11.2.4.6A: Test parameters for E-AGCH detection

Parameter	Unit	Missed detection
PRRI		TBD

Table 11.2.4.6B: Test requirements for E-AGCH detection (3.84 Mcps TDD option)

Test Number	E-AGCH $\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	2.2	0.01

11.2.5.2 1.28Mcps TDD Option

The missed detection probability shall not exceed to the values specified in Table 11.2.4.8.

The missed detection probability = the ratio of (missed detection event)/ (all detected E-TFCI event) ≤ 0.01.

Tables 11.2.4.7 and 11.2.4.8 define the primary level settings including test tolerance and test parameters for the test.

Table 11.2.4.7: Test parameters for E-AGCH detection

Parameter	Unit	Missed detection
PRRI		TBD

Table 11.2.4.8 : Test requirements for E-AGCH detection (1.28 Mcps TDD option)

Test Number	E-AGCH $\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	8.6	0.01

11.2.5.3 7.68Mcps TDD Option

The missed detection probability shall not exceed to the values specified in Table 11. 2.4.9 for 7.68 Mcps TDD option.

The missed detection probability = the ratio of (missed detection event)/ (all detected E-TFCI event) ≤ 0.01.

Tables 11.2.4.9 and 11.2.4.10 define the primary level settings including test tolerance and test parameters for the test.

Table 11.2.4.9: Test parameters for E-AGCH detection

Parameter	Unit	Missed detection
PRRI		TBD

Table 11.2.4.10: Test requirements for E-AGCH detection (7.68 Mcps TDD option)

Test Number	E-AGCH $\hat{I}_{or}/I_{oc}$ (dB)	Missed Detection Probability
1	1.8	0.01

12 Performance requirement under multiple-cell scenario

12.1 General

The performance requirements for the UE in this clause is specified for the measurement channels specified in annex C and the propagation conditions specified in annex D. Unless otherwise stated the receiver characteristics are specified at the antenna connector of the UE. For UE(s) with an integral antenna only, a reference antenna with a gain of 0 dBi is

assumed. UE with an integral antenna may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. For UEs with more than one receiver antenna connector the fading of the signals and the AWGN signals applied to each receiver antenna connector shall be uncorrelated. The levels of the test signal applied to each of the antenna connectors shall be as defined in the respective sections below.

Table 12.1: Summary of UE performance targets

Test Chs.	Information Data Rate	Performance metric		
		Static	Multi-path Case 1	Multi-path Case 3
DCH	12.2 kbps	BLER<10^{-2}	BLER<10^{-2}	BLER<10^{-2}
	64 kbps	BLER<10^{-1}	BLER<10^{-1}	BLER<10^{-1}

All Block Error ratio (BLER) measurements in clause 12 shall be performed according to the general rules for statistical testing in Annex F.6.

12.1.2 Definition of Additive White Gaussian Noise (AWGN) Interferer

The minimum bandwidth of the AWGN interferer shall be 1.5 times chip rate of the radio access mode. (e.g. 5.76 MHz for a chip rate of 3,84 Mcps). The flatness across this minimum bandwidth shall be less than 0.5 dB and the peak to average ratio at a probability of 0.001% shall exceed 10 dB.

12.2 Demodulation of DCH in static propagation conditions

12.2.1 Definition and applicability

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of 1.28 Mcps TDD UE of Release 11 and later.

12.2.2 Minimum requirements

12.2.2.1 3.84 Mcps TDD Option

[FFS]

12.2.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 12.2.2.2a and and Table 12.2.2.2b the BLER should not exceed the piece-wise linear BLER curve specified in Table 12.2.2.2c. The reference for this requirement is TS 25.102 [1] clause 12.2.1.2.

Table 12.2.2.2a: DCH parameters in static propagation conditions (12.2 kbps)

Parameters	Unit	Test 1	Test 2	Test 3
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) i=1,2	C(i,16) i=1,2	C(i,16) i=1,2
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.2.2.2b: DCH parameters in static propagation conditions (64 kbps)

Parameters	Unit	Test 4	Test 5	Test 6
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.2.2.2c: Minimum requirements in static propagation conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	-0.3	10^{-2}
2	2.8	10^{-2}
3	8.7	10^{-2}
4	4.1	10^{-1}
5	10.7	10^{-1}
6	12.9	10^{-1}

12.2.2.3 7.68 Mcps TDD Option

[FFS]

12.2.3 Test purpose

The test purpose is to verify the ability of the receiver to receive a predefined test signal ,representing a static propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) not exceeding a specified value.

12.2.4 Method of test

12.2.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS, AWGN Generator and additional components to the UE antenna connector as shown in figure A.19.

2) A call is set up according to the Generic call setup procedure. The characteristic of the call shall be according to the DL reference measurement channels (12,2 kbit/s) or (64 kbit/s) specified in annex C for 1.28Mcps TDD option.

3) Enter the UE into loopback test mode and start the loopback test. (test 1) and/or activate the Ack/Nack test mode.

4) The levels of the wanted signal and the co-channel signals are set according to Table 12.2.2.2a, Table 12.2.2.2b and Table 12.2.2.2c for the 1,28 Mcps TDD Option.

12.2.4.2 Procedure

Measure the BLER of DCH received from the UE at the SS for all tests specified in Table 12.2.2.2a and Table 12.2.2.2b for 1,28 Mcps TDD Option.

12.2.5 Test requirements

12.2.5.1 3.84Mcps TDD Option

[FFS]

12.2.5.2 1.28Mcps TDD Option

The measured BLER shall not exceed the values indicated in table 12.2.5.2 for 1.28 Mcps TDD Option.

Table 12.2.5.2: Performance requirements in static propagation conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	0.3	10^{-2}
2	3.4	10^{-2}
3	9.3	10^{-2}
4	4.7	10^{-1}
5	11.3	10^{-1}
6	13.5	10^{-1}

NOTE: If the Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero.

12.2.5.3 7.68Mcps TDD Option

[FFS]

12.3 Demodulation of DCH in Multipath fading Case 1 conditions

12.3.1 Definition and applicability

The performance requirement of DCH in Multipath fading Case 1 conditions is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of 1.28 Mcps TDD UE of Release 11 and later.

12.3.2 Minimum requirements

12.3.2.1 3.84 Mcps TDD Option

[FFS]

12.3.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 12.3.2.2a and and Table 12.3.2.2b the BLER should not exceed the piece-wise linear BLER curve specified in Table 12.3.2.2c. The reference for this requirement is TS 25.102 [1] clause 12.3.1.2.

Table 12.3.2.2a: DCH parameters in Multipath fading Case 1 conditions (12.2 kbps)

Parameters	Unit	Test 1	Test 2	Test 3
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) i=1,2	C(i,16) i=1,2	C(i,16) i=1,2
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.3.2.2b: DCH parameters in Multipath fading Case 1 conditions (64 kbps)

Parameters	Unit	Test 4	Test 5	Test 6
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.3.2.2c: Performance requirements in Multipath fading Case 1 conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	11.8	10^{-2}
2	15.2	10^{-2}
3	19.5	10^{-2}
4	13.3	10^{-1}
5	18.4	10^{-1}
6	21.1	10^{-1}

12.3.2.3 7.68 Mcps TDD Option

[FFS]

12.3.3 Test purpose

The test purpose is to verify the ability of the receiver to receive a predefined test signal ,representing a static propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) not exceeding a specified value.

12.3.4 Method of test

12.3.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS, the fading simulator, AWGN Generator and additional components to the UE antenna connector as shown in figure A.20.

2) A call is set up according to the Generic call setup procedure. The characteristic of the call shall be according to the DL reference measurement channels (12,2 kbit/s) or (64 kbit/s) specified in annex C for 1.28Mcps TDD option.

3) Enter the UE into loopback test mode and start the loopback test. (test 1) and/or activate the Ack/Nack test mode.

4) The levels of the wanted signal and the co-channel signals are set according to Table 12.3.2.2a, Table 12.3.2.2b and Table 12.3.2.2c for the 1,28 Mcps TDD Option.

12.3.4.2 Procedure

Measure the BLER of DCH received from the UE at the SS for all tests specified in Table 12.3.2.2a and Table 12.3.2.2b for 1,28 Mcps TDD Option.

12.3.5 Test requirements

12.3.5.1 3.84Mcps TDD Option

[FFS]

12.3.5.2 1.28Mcps TDD Option

The measured BLER shall not exceed the values indicated in table 12.3.5.2 for 1.28 Mcps TDD Option.

Table 12.3.5.2: Performance requirements in static propagation conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	13.0	10^{-2}
2	16.4	10^{-2}
3	20.7	10^{-2}
4	14.5	10^{-1}
5	19.6	10^{-1}
6	22.3	10^{-1}

NOTE: If the Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero.

12.3.5.3 7.68Mcps TDD Option

[FFS]

12.4 Demodulation of DCH in Multipath fading Case 3 conditions

12.4.1 Definition and applicability

The performance requirement of DCH in Multipath fading Case 3 conditions is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of 1.28 Mcps TDD UE of Release 11 and later.

12.4.2 Minimum requirements

12.4.2.1 3.84 Mcps TDD Option

[FFS]

12.4.2.2 1.28 Mcps TDD Option

For the parameters specified in Table 12.4.2.2a and and Table 12.4.2.2b the BLER should not exceed the piece-wise linear BLER curve specified in Table 12.4.2.2c. The reference for this requirement is TS 25.102 [1] clause 12.4.1.2.

Table 12.4.2.2a: DCH parameters in Multipath fading Case 3 conditions (12.2 kbps)

Parameters	Unit	Test 1	Test 2	Test 3
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) i=1,2	C(i,16) i=1,2	C(i,16) i=1,2
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.4.2.2b: DCH parameters in Multipath fading Case 3 conditions (64 kbps)

Parameters	Unit	Test 4	Test 5	Test 6
Number of $DPCH_o$		4	12	28
Scrambling code and basic midamble code number of SS#1*		19	19	19
Scrambling code and basic midamble code number of SS#2*		58	58	58
Scrambling code and basic midamble code number of SS#3*		85	85	85
DPCH Channelization Codes of SS#1*	C(k,Q)	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8	C(i,16) 1≤ i ≤8
$DPCH_o$ Channelization Codes of SS#2*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$DPCH_o$ Channelization Codes of SS#3*	C(k,Q)	C(i,16) 1≤ i ≤2	C(i,16) 1≤ i ≤6	C(i,16) 1≤ i ≤14
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#2	dB	10	5	0
$\frac{DPCH_o\_Ec}{I_{oc}}$ of SS#3	dB	4	-1	-6
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#2	chip	0	0	0
SFN-SFN Observed Timing Difference Type 2 between SS#1 and SS#3	chip	0	0	0
Power of SS#2**	dBm	-67	-67.22	-68.54
Power of SS#3**	dBm	-73	-73.22	-74.54
I_{oc}	dBm/1,28MHz	-80		
Midamble		Default midamble (Kcell = 8)		

*Note: Refer to TS 25.223 for definition of channelization codes, scrambling code and basic midamble code.

**Note: Power of SS can be calculated from $\frac{DPCH_o\_Ec}{I_{oc}}$ and I_{oc}.

Table 12.4.2.2c: Performance requirements in Multipath fading Case 3 conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	6.5	10^{-2}
2	8.8	10^{-2}
3	11.6	10^{-2}
4	10.9	10^{-1}
5	14.3	10^{-1}
6	17.0	10^{-1}

12.4.2.3 7.68 Mcps TDD Option

[FFS]

12.4.3 Test purpose

The test purpose is to verify the ability of the receiver to receive a predefined test signal ,representing a static propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) not exceeding a specified value.

12.4.4 Method of test

12.4.4.1 Initial conditions

Test environment: normal; see clauses G.2.1 and G.2.2.

Frequencies to be tested: mid range; see clause G.2.4.

1) Connect the SS, the fading simulator, AWGN Generator and additional components to the UE antenna connector as shown in figure A.20.

2) A call is set up according to the Generic call setup procedure. The characteristic of the call shall be according to the DL reference measurement channels (12,2 kbit/s) or (64 kbit/s) specified in annex C for 1.28Mcps TDD option.

3) Enter the UE into loopback test mode and start the loopback test. (test 1) and/or activate the Ack/Nack test mode.

4) The levels of the wanted signal and the co-channel signals are set according to Table 12.4.2.2a, Table 12.4.2.2b and Table 12.4.2.2c for the 1,28 Mcps TDD Option.

12.4.4.2 Procedure

Measure the BLER of DCH received from the UE at the SS for all tests specified in Table 12.4.2.2a and Table 12.4.2.2b for 1,28 Mcps TDD Option.

12.4.5 Test requirements

12.4.5.1 3.84Mcps TDD Option

[FFS]

12.4.5.2 1.28Mcps TDD Option

The measured BLER shall not exceed the values indicated in table 12.4.5.2 for 1.28 Mcps TDD Option.

Table 12.4.5.2: Performance requirements in static propagation conditions

Test Number	$\frac{\hat{I}_{or1}}{I_{oc}}$ [dB]	BLER
1	7.7	10^{-2}
2	10.0	10^{-2}
3	12.8	10^{-2}
4	12.1	10^{-1}
5	15.5	10^{-1}
6	18.2	10^{-1}

NOTE: If the Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero.

12.4.5.3 7.68Mcps TDD Option

[FFS]