

7 Performance requirements

7.1 General

The performance requirements for the UE in this clause are specified for the measurement channels specified in annex C and table 7.1.1, the propagation conditions specified in clause 7.1.2 and the Down link Physical channels specified in annex D. Unless stated otherwise, DL power control is OFF. Unless otherwise stated the performance requirements are specified at the antenna connector of the UE. For UE(s) with more than one receive 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.

When DCCH has been configured on downlink DCH then DCCH Data shall be continuously transmitted on downlink DCH during the measurement period. When there is no signalling to transmit on downlink DCCH then dummy DCCH transmission as described in Annex C.9 shall be used.

The method for Block Error Ratio (BLER) measurement is specified in Annex C.6. See 3GPP TS 34.109 [4] for details regarding the UE test loop.

Table 7.1.1: Bit / Symbol rate for Test Channel

Type of User Information	User bit rate	DL DPCH symbol rate	DL DPCH bit rate	TTI (ms)
12,2 kbps reference measurement channel	12,2 kbps	30 ksps	60 kbps	20
64 kbps reference measurement channel	64 kbps	120 ksps	240 kbps	20
144kbps reference measurement channel	144 kbps	240 ksps	480 kbps	20
384 kbps reference measurement channel	384 kbps	480 ksps	960 kbps	10

The common RF test conditions of Performance requirement are defined in clause E.3.3, and each test conditions in this clause (clause 7) should refer clause E.3.3. Individual test conditions are defined in the paragraph of each test.

All Block Error ratio (BLER) measurements in clause 7 shall be performed according to the general rules for statistical testing in Annex F.6

7.1.1 Measurement Configurations

It is assumed that fields inside DPCH have the same energy per PN chip. Also, if the power of S-CCPCH is not specified in the test parameter table, it should be set to zero. The power of OCNS should be adjusted that the power ratios (E_c/I_{or}) of all specified downlink channels add up to one.

Unless otherwise stated, the UE output power for the tests shall be greater than -10 dBm.

NOTE 1: If tests are performed with maximum UE output power it is known that this may cause a good UE to fail at least for tests in sections 7.7 and 7.10.

7.1.2 Definition of Additive White Gaussian Noise (AWGN) Interferer

See clause D.1.1.

7.2 Demodulation in Static Propagation conditions

7.2.1 Demodulation of Dedicated Channel (DCH)

7.2.1.1 Definition and applicability

The receive characteristic of the Dedicated Channel (DCH) in the static environment is determined by the Block Error Ratio (BLER). BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.2.1.2 Minimum requirements

For the parameters specified in table 7.2.1.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.2.1.2. These requirements are applicable for TFCS size 16.

Table 7.2.1.1: DCH parameters in static propagation conditions

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-1				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.2.1.2: DCH requirements in static propagation conditions

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-16,6 dB	10^{-2}
2	-13,1 dB	10^{-1}
	-12,8 dB	10^{-2}
3	-9,9 dB	10^{-1}
	-9,8 dB	10^{-2}
4	-5,6 dB	10^{-1}
	-5,5 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.2.3.1.

7.2.1.3 Test purpose

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 BLER not exceeding a specified value.

7.2.1.4 Method of test

7.2.1.4.1 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 and an AWGN noise source to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26.
2. Set up a call according to the Generic call setup procedure TS 34.108 [3] sub clause 7.3.2.

3. Set the test parameters for test 1-4 as specified in table 7.2.1.3.
4. Enter the UE into loopback test mode and start the loopback test.

7.2.1.4.2 Procedures

1. Measure BLER of DCH.

7.2.1.5 Test requirements

For the parameters specified in table 7.2.1.3 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.2.1.4. These requirements are applicable for TFCS size 16.

NOTE: The test case is executed with TFCS size 4 according to the Reference Measurement Channels defined in Annex C.

Table 7.2.1.3: DCH parameters in static propagation conditions

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-0,7				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.2.1.4: DCH requirements in static propagation conditions

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-16,5 dB	10^{-2}
2	-13,0 dB	10^{-1}
	-12,7 dB	10^{-2}
3	-9,8 dB	10^{-1}
	-9,7 dB	10^{-2}
4	-5,5 dB	10^{-1}
	-5,4 dB	10^{-2}

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.

7.3 Demodulation of DCH in Multi-path Fading Propagation conditions

7.3.1 Single Link Performance

7.3.1.1 Definition and applicability

The receive characteristics of the Dedicated Channel (DCH) in different multi-path fading environments are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into in Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.3.1.2 Minimum requirements

For the parameters specified in tables 7.3.1.1, 7.3.1.3, 7.3.1.5, 7.3.1.7 and 7.3.1.9 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in tables 7.3.1.2, 7.3.1.4, 7.3.1.6, 7.3.1.8 and 7.3.1.10. These requirements are applicable for TFCS size 16.

Table 7.3.1.1: DCH parameters in multi-path fading propagation conditions (Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	9				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.2: DCH requirements in multi-path fading propagation conditions (Case 1)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-15,0 dB	10^{-2}
2	-13,9 dB	10^{-1}
	-10,0 dB	10^{-2}
3	-10,6 dB	10^{-1}
	-6,8 dB	10^{-2}
4	-6,3 dB	10^{-1}
	-2,2 dB	10^{-2}

Table 7.3.1.3: DCH parameters in multi-path fading propagation conditions (Case 2)

Parameter	Test 5	Test 6	Test 7	Test 8	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-3	-3	3	6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.4: DCH requirements in multi-path fading propagation conditions (Case 2)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
5	-7,7 dB	10^{-2}
6	-6,4 dB	10^{-1}
	-2,7 dB	10^{-2}
7	-8,1 dB	10^{-1}
	-5,1 dB	10^{-2}
8	-5,5 dB	10^{-1}
	-3,2 dB	10^{-2}

Table 7.3.1.5: DCH parameters in multi-path fading propagation conditions (Case 3)

Parameter	Test 9	Test 10	Test 11	Test 12	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-3	-3	3	6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.6: DCH requirements in multi-path fading propagation conditions (Case 3)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
9	-11,8 dB	10^{-2}
10	-8,1 dB	10^{-1}
	-7,4 dB	10^{-2}
	-6,8 dB	10^{-3}
11	-9,0 dB	10^{-1}
	-8,5 dB	10^{-2}
	-8,0 dB	10^{-3}
12	-5,9 dB	10^{-1}
	-5,1 dB	10^{-2}
	-4,4 dB	10^{-3}

Table 7.3.1.7: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

Parameter	Test 13	Test 14	Test 15	Test 16	Unit
Phase reference	S-CPICH				
\hat{I}_{or}/I_{oc}	9				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.8: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
13	-15,0 dB	10^{-2}
14	-13,9 dB	10^{-1}
	-10,0 dB	10^{-2}
15	-10,6 dB	10^{-1}
	-6,8 dB	10^{-2}
16	-6,3 dB	10^{-1}
	-2,2 dB	10^{-2}

Table 7.3.1.9: DCH parameters in multi-path fading propagation conditions (Case 6)

Parameter	Test 17	Test 18	Test 19	Test 20	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-3	-3	3	6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.10: DCH requirements in multi-path fading propagation conditions (Case 6)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
17	-8,8 dB	10^{-2}
18	-5,1 dB	10^{-1}
	-4,4 dB	10^{-2}
	-3,8 dB	10^{-3}
19	-6,0 dB	10^{-1}
	-5,5 dB	10^{-2}
	-5,0 dB	10^{-3}
20	-2,9 dB	10^{-1}
	-2,1 dB	10^{-2}
	-1,4 dB	10^{-3}

The reference for this requirement is TS 25.101 [1] clause 8.3.1.1.

7.3.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.3.1.4 Method of test

7.3.1.4.1 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, multi-path fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
2. Set up a call according to the Generic call setup procedure TS34.108 [3] sub clause 7.3.2.
3. Set the test parameters for test 1-20 as specified table 7.3.1.11, table 7.3.1.13, table 7.3.1.15, table 7.3.1.17 and table 7.3.1.19.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulators as fading condition case 1, case 2, case 3 and case 6, which are described in table D.2.2.1.

7.3.1.4.2 Procedures

1. Measure BLER of DCH.

7.3.1.5 Test requirements

For the parameters specified in tables 7.3.1.11, 7.3.1.13, 7.3.1.15, 7.3.1.17 and 7.3.1.19 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in tables 7.3.1.12, 7.3.1.14, 7.3.1.16,

7.3.1.18 and 7.3.1.20. These requirements are applicable for TFCS size 16.

NOTE: The test case is executed with TFCS size 4 according to the Reference Measurement Channels defined in Annex C.

Table 7.3.1.11: DCH parameters in multi-path fading propagation conditions (Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	9,6				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.12: DCH requirements in multi-path fading propagation conditions (Case 1)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-14,9 dB	10^{-2}
2	-13,8 dB	10^{-1}
	-9,9 dB	10^{-2}
3	-10,5 dB	10^{-1}
	-6,7 dB	10^{-2}
4	-6,2 dB	10^{-1}
	-2,1 dB	10^{-2}

Table 7.3.1.13: DCH parameters in multi-path fading propagation conditions (Case 2)

Parameter	Test 5	Test 6	Test 7	Test 8	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-2,4	-2,4	3,6	6,6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.14: DCH requirements in multi-path fading propagation conditions (Case 2)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
5	-7,6 dB	10^{-2}
6	-6,3 dB	10^{-1}
	-2,6 dB	10^{-2}
7	-8,0 dB	10^{-1}
	-5,0 dB	10^{-2}
8	-5,4 dB	10^{-1}
	-3,1 dB	10^{-2}

Table 7.3.1.15: DCH parameters in multi-path fading propagation conditions (Case 3)

Parameter	Test 9	Test 10	Test 11	Test 12	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-2,4	-2,4	3,6	6,6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.16: DCH requirements in multi-path fading propagation conditions (Case 3)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
9	-11,7 dB	10^{-2}
10	-8,0 dB	10^{-1}
	-7,3 dB	10^{-2}
	-6,7 dB	10^{-3}
11	-8,9 dB	10^{-1}
	-8,4 dB	10^{-2}
	-7,9 dB	10^{-3}
12	-5,8 dB	10^{-1}
	-5,0 dB	10^{-2}
	-4,3 dB	10^{-3}

Table 7.3.1.17: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

Parameter	Test 13	Test 14	Test 15	Test 16	Unit
Phase reference	S-CPICH				
\hat{I}_{or}/I_{oc}	9,6				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.18: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
13	-14,9 dB	10^{-2}
14	-13,8 dB	10^{-1}
	-9,9 dB	10^{-2}
15	-10,5 dB	10^{-1}
	-6,7 dB	10^{-2}
16	-6,2 dB	10^{-1}
	-2,1 dB	10^{-2}

Table 7.3.1.19: DCH parameters in multi-path fading propagation conditions (Case 6)

Parameter	Test 17	Test 18	Test 19	Test 20	Unit
Phase reference	P-CPICH				
\hat{I}_{or}/I_{oc}	-2,4	-2,4	3,6	6,6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.3.1.20: DCH requirements in multi-path fading propagation conditions (Case 6)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
17	-8,7 dB	10^{-2}
18	-5,0 dB	10^{-1}
	-4,3 dB	10^{-2}
19	-3,7 dB	10^{-3}
	-5,9 dB	10^{-1}
	-5,4 dB	10^{-2}
20	-4,9 dB	10^{-3}
	-2,8 dB	10^{-1}
	-2,0 dB	10^{-2}
	-1,3 dB	10^{-3}

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.

7.4 Demodulation of DCH in Moving Propagation conditions

7.4.1 Single Link Performance

7.4.1.1 Definition and applicability

The receive single link performance of the Dedicated Channel (DCH) in dynamic moving propagation conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.4.1.2 Minimum requirements

For the parameters specified in table 7.4.1.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.4.1.2.

Table 7.4.1.1: DCH parameters in moving propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
\hat{I}_{or}/I_{oc}	-1		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2	64	kbps

Table 7.4.1.2: DCH requirements in moving propagation conditions

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-14,5 dB	10^{-2}
2	-10,9 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.4.1.1.

7.4.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a moving propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.4.1.4 Method of test

7.4.1.4.1 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 and an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
2. Set up a call according to the Generic call setup procedure TS34.108 [3] sub clause 7.3.2.
3. Set the test parameters as specified in table 7.4.1.3.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulator as moving propagation condition, which is described in clause D.2.3.

7.4.1.4.2 Procedures

1. Measure BLER of DCH.

7.4.1.5 Test requirements

For the parameters specified in table 7.4.1.3 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.4.1.4.

Table 7.4.1.3: DCH parameters in moving propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
\hat{I}_{or}/I_{oc}	-0,4		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2	64	kbps

Table 7.4.1.4: DCH requirements in moving propagation conditions

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-14,4 dB	10^{-2}
2	-10,8 dB	10^{-2}

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.

7.5 Demodulation of DCH in Birth-Death Propagation conditions

7.5.1 Single Link Performance

7.5.1.1 Definition and applicability

The receive single link performance of the Dedicated Channel (DCH) in dynamic birth-death propagation conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE.

7.5.1.2 Minimum requirements

For the parameters specified in table 7.5.1.1 the average downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.5.1.2.

Table 7.5.1.1: DCH parameters in birth-death propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
\hat{I}_{or}/I_{oc}	-1		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2	64	kbps

Table 7.5.1.2: DCH requirements in birth-death propagation conditions

Test Number	$\frac{DPCH - E_c}{I_{or}}$	BLER
1	-12,6 dB	10^{-2}
2	-8,7 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.5.1.1.

7.5.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a birth-death propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.5.1.4 Method of test

7.5.1.4.1 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 an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
2. Set up a call according to the Generic call setup procedure TS34.108 [3] sub clause 7.3.2.
3. Set the test parameters as specified in table 7.5.1.3.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulator as birth-death propagation condition, which is described in clause D.2.4.

7.5.1.4.2 Procedures

1. Measure BLER of DCH.

7.5.1.5 Test requirements

For the parameters specified in table 7.5.1.3 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.5.1.4.

Table 7.5.1.3: DCH parameters in birth-death propagation conditions

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		
\hat{I}_{or}/I_{oc}	-0,4		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2	64	kbps

Table 7.5.1.4: DCH requirements in birth-death propagation conditions

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-12,5 dB	10^{-2}
2	-8,6 dB	10^{-2}

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.

7.5A Demodulation of DCH in high speed train condition

7.5A.1 Single Link Performance

7.5A.1.1 Definition and applicability

The receive single link performance of the Dedicated Channel (DCH) in high speed train conditions are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into Dedicated Physical Channel (DPCH).

The data-rate-corresponding requirements shall apply to the UE for Release 7 and later releases.

7.5A.1.2 Minimum requirement

For the parameters specified in Table 7.5A.1.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 7.5A.2.

Table 7.5A.1.1: DCH parameters in high speed train condition

Parameter	Unit	Test 1
Phase reference		P-CPICH
\hat{I}_{or}/I_{oc}	dB	5
I_{oc}	dBm/3.84 MHz	-60
Information Data Rate	kbps	12.2

Table 7.5A.1.2: DCH requirements in high speed train condition

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-21.8	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.5A.1.1.

7.5A.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a high speed train channel for the wanted and for the co-channel signals from serving and adjacent cells, with a BLER not exceeding a specified value.

7.5A.1.4 Method of test

7.5A.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 an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
2. Set up a call according to the Generic call setup procedure in TS34.108[3] sub clause 7.3.2.
3. Set the test parameters as specified in table 7.5A.1.3.
4. Enter the UE into loopback test mode and start the loopback test.
5. Setup fading simulator as High speed train conditions, which is described in clause D.2.4A.

7.5A.1.4.2 Procedures

1. Measure BLER of DCH.

7.5A.1.5 Test requirements

For the parameters specified in table 7.5A.1.3 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.5A.1.4.

Table 7.5A.1.3: DCH parameters in high speed train condition

Parameter	Unit	Test 1
Phase reference		P-CPICH
\hat{I}_{or}/I_{oc}	dB	5.6
I_{oc}	dBm/3.84 MHz	-60
Information Data Rate	kbps	12.2

Table 7.5A.1.4: DCH requirements in high speed train condition

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-21.7	10^{-2}

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.

7.6 Demodulation of DCH in downlink Transmit diversity modes

7.6.1 Demodulation of DCH in open-loop transmit diversity mode

7.6.1.1 Definition and applicability

The receive characteristic of the Dedicated Channel (DCH) in open loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

The requirements and this test apply to all types of UTRA for the FDD UE.

7.6.1.2 Minimum requirements

For the parameters specified in table 7.6.1.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.1.2.

Table 7.6.1.1: Test parameters for DCH reception in a open-loop transmit diversity scheme (Propagation condition: Case 1)

Parameter	Test 1	Unit
Phase reference	P-CPICH	
\hat{I}_{or}/I_{oc}	9	dB
I_{oc}	-60	dBm / 3,84 MHz
Information data rate	12,2	kbps

Table 7.6.1.2: Test requirements for DCH reception in open-loop transmit diversity scheme

Test Number	$\frac{DPCH_E_c}{I_{or}}$ (antenna 1/2)	BLER
1	-16,8 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.6.1.1.

7.6.1.3 Test purpose

To verify that UE reliably demodulates the DPCH of the Node B while open loop transmit diversity is enabled during the connection.

7.6.1.4 Method of test

7.6.1.4.1 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 SS, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in figure A.12. In case of UE-receive diversity connect according to figure A.22.
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exceptions for information elements listed in table 7.6.1.3. With these exceptions, open-loop transmit diversity mode is activated.
- 3) RF parameters are set up according to table 7.6.1.4 and table E 3.4.
- 4) Enter the UE into loopback test mode and start the loopback test.
- 5) Set up fading simulators as fading condition case 1, which is described in table D.2.2.1.

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

Table 7.6.1.3: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

Information Element	Value/remark
PRACH system information list - AICH info - STTD Indicator	TRUE
Secondary CCPCH system information - PICH info - STTD Indicator - Secondary CCPCH info - STTD Indicator	TRUE TRUE
Primary CCPCH info - CHOICE mode - TX Diversity indicator	FDD TRUE

SYSTEM INFORMATION BLOCK TYPE11

Information Element	Value/remark
New intra-frequency cells - Intra-frequency cell id	1
- TX Diversity indicator	TRUE

RRC CONNECTION SETUP

Information Element	Value/remark
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	FDD STTD,
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

RADIO BEARER SETUP

Information Element	Value/remark
Downlink information common for all radio links - Choice mode - TX Diversity Mode	FDD STTD
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

7.6.1.4.2 Procedure

- 1) Measure BLER in points specified in table 7.6.1.5.

7.6.1.5 Test Requirements

For the parameters specified in table 7.6.1.4 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.1.5.

Table 7.6.1.4: Test parameters for DCH reception in a open-loop transmit diversity scheme (Propagation condition: Case 1)

Parameter	Test 1	Unit
Phase reference	P-CPICH	
\hat{I}_{or}/I_{oc}	9,8	dB
I_{oc}	-60	dBm / 3,84 MHz
Information data rate	12,2	kbps

Table 7.6.1.5: Test requirements for DCH reception in open-loop transmit diversity scheme

Test Number	$\frac{DPCH_E_c}{I_{or}}$ (antenna 1/2)	BLER
1	-16,7 dB	10^{-2}

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.

7.6.2 Demodulation of DCH in closed loop transmit diversity mode

7.6.2.1 Definition and applicability

The receive characteristic of the dedicated channel (DCH) in closed loop transmit diversity mode is determined by the Block Error Ratio (BLER). DCH is mapped into in Dedicated Physical Channel (DPCH).

The requirements for Closed loop mode 1 and test 1 apply to all types of UTRA for the FDD UE. The requirements for Closed loop mode 2 and test 2 apply to all types of UTRA for the FDD UE for Release 99 and Release 4 only.

7.6.2.2 Minimum requirements

For the parameters specified in table 7.6.2.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.2.2.

Table 7.6.2.1: Test Parameters for DCH Reception in closed loop transmit diversity mode (Propagation condition: Case 1)

Parameter	Test 1 (Mode 1)	Test 2 (Mode 2)	Unit
\hat{I}_{or}/I_{oc}	9	9	dB
I_{oc}	-60	-60	dBm / 3,84 MHz
Information data rate	12,2	12,2	kbps
Feedback error ratio	4	4	%
Closed loop timing adjustment mode	1	1	-

Table 7.6.2.2: Test requirements for DCH reception in closed loop transmit diversity mode

Test Number	$\frac{DPCH - E_c}{I_{or}}$ (see note)	BLER
1	-18,0 dB	10^{-2}
2	-18,3 dB	10^{-2}
NOTE: This is the total power from both antennas. Power sharing between antennas are closed loop mode dependent as specified in TS 25.214 [5].		

The reference for this requirement is TS 25.101 [1] clause 8.6.2.1.

7.6.2.3 Test purpose

To verify that UE reliably demodulates the DPCH of the Node B while closed loop transmit diversity is enabled during the connection.

7.6.2.4 Method of test

7.6.2.4.1 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 SS, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in figure A.12. In case of UE-receive diversity connect according to figure A.22.
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exceptions for information elements listed in table 7.6.2.3. With these exceptions, closed loop transmit diversity mode is activated.
- 3) RF parameters are set up according to table 7.6.2.1 and table E 3.5.
- 4) Enter the UE into loopback test mode and start the loopback test.
- 5) Set up fading simulators as fading condition case 1, which is described in table D.2.2.1.

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

Table 7.6.2.3: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

Information Element	Value/remark
PRACH system information list - AICH info - STTD Indicator	TRUE
Secondary CCPCH system information - PICH info - STTD Indicator - Secondary CCPCH info - STTD Indicator	TRUE TRUE TRUE
Primary CCPCH info - CHOICE mode - TX Diversity indicator	FDD TRUE

SYSTEM INFORMATION BLOCK TYPE11

Information Element	Value/remark
New intra-frequency cells - Intra-frequency cell id	1
- TX Diversity indicator	TRUE

RRC CONNECTION SETUP for Closed loop mode1

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	FDD Closed loop mode1
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

RRC CONNECTION SETUP for Closed loop mode2

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	FDD Closed loop mode2
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

RADIO BEARER SETUP for Closed loop mode1

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links - Choice mode - TX Diversity Mode	FDD Closed loop mode1
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

RADIO BEARER SETUP for Closed loop mode2

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links - Choice mode - TX Diversity Mode	FDD Closed loop mode2
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	FDD 1

7.6.2.4.2 Procedure

- 1) Measure BLER in points specified in table 7.6.2.2.

7.6.2.5 Test Requirements

For the parameters specified in table 7.6.2.4 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.2.5.

Table 7.6.2.4: Test Parameters for DCH Reception in closed loop transmit diversity mode (Propagation condition: Case 1)

Parameter	Test 1 (Mode 1)	Test 2 (Mode 2)	Unit
\hat{I}_{or}/I_{oc}	9,8	9,8	dB
I_{oc}	-60	-60	dBm / 3,84 MHz
Information data rate	12,2	12,2	kbps
Feedback error ratio (*)	4	4	%
Closed loop timing adjustment mode	1	1	-
* Note: As the uplink is error free, the feedback error ratio is generated by the SS internally as follows: 4% of the feedback bits, received by the SS on the uplink, shall be inverted prior to being processed. The inverted bits shall occur at random, e.g. controlled by a random generator.			

Table 7.6.2.5: Test requirements for DCH reception in closed loop transmit diversity mode

Test Number	$\frac{DPCH_E_c}{I_{or}}$ (see note)	BLER
1	-17,9 dB	10^{-2}
2	-18,2 dB	10^{-2}
NOTE: This is the total power from both antennas. Power sharing between antennas are closed loop mode dependent as specified in TS 25.214 [5].		

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.

7.6.3 Demodulation of DCH in Site Selection Diversity Transmission Power Control mode

7.6.3.1 Definition and applicability

The bit error characteristics of UE receiver is determined in Site Selection Diversity Transmission Power Control (SSDT) mode. Two Node B emulators are required for this performance test. The delay profiles of signals received from different base stations are assumed to be the same but time shifted by 10 chip periods.

The requirements and this test apply to all types of UTRA for the Release 99 and Release 4 FDD UE.

7.6.3.2 Minimum requirements

The downlink physical channels and their relative power to I_{or} are the same as those specified in clause E.3.3 irrespective of Node Bs and the test cases. $DPCH_E_c/I_{or}$ value applies whenever DPDCH in the cell is transmitted. In Test 1 and Test 3, the received powers at UE from two Node Bs are the same, while 3dB offset is given to one that comes from one of Node Bs for Test 2 and Test 4 as specified in table 7.6.3.1.

For the parameters specified in table 7.6.3.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.3.2.

Table 7.6.3.1: DCH parameters in multi-path propagation conditions during SSDT mode (Propagation condition: Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc}	0	-3	0	0	dB
\hat{I}_{or2}/I_{oc}	0	0	0	-3	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	12,2	12,2	12,2	kbps
Cell ID code word error ratio in uplink (note)	1	1	1	1	%
Number of FBI bits assigned to "S" Field	1	1	2	2	
Code word Set	Long	Long	Short	Short	
UL DPCCH slot Format	#2		#5		
NOTE: The code word errors are introduced independently in both uplink channels.					

Table 7.6.3.2: DCH requirements in multi-path propagation conditions during SSDT Mode

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-6,0 dB	10^{-2}
2	-5,0 dB	10^{-2}
3	-10,5 dB	10^{-2}
4	-9,2 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.6.3.1.

7.6.3.3 Test purpose

To verify that UE reliably demodulates the DPCH of the selected Node B while site selection diversity is enabled during soft handover.

7.6.3.4 Method of test

7.6.3.4.1 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 two SS's, multi-path fading simulators and an AWGN source to the UE antenna connector as shown in figure A.11 In case of UE-receive diversity connect according to figure A.24.
- 2) Activate one of two cells (Cell 1).
- 3) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exceptions for information elements listed in table 7.6.3.3A. With these exceptions, necessary information for SSDT mode is sent to the UE.
- 4) Activate the other cell (Cell 2) on the other SS.
- 5) RF parameters are set up according to table 7.6.3.4 and table 7.6.3.5
- 6) After receiving MEASUREMENT REPORT message from the UE, send the ACTIVESET UPDATE message from Cell 1 to the UE in order to activate SSDT mode. Contents of the message is specified in table 7.6.3.3B
- 7) Enter the UE into loopback test mode and start the loopback test.
- 8) Set up fading simulators as fading condition case 1, which is described in table D.2.2.1.

Table 7.6.3.3A: Specific Message Contents for SSDT mode

RRC CONNECTION SETUP for Test 1 and Test 2

Information Element	Value/remark
Downlink information common for all radio links - CHOICE mode - SSDT information - S field - Code Word Set	FDD 1 long
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - SSDT Cell Identity	FDD a

RRC CONNECTION SETUP for Test 3 and Test 4

Information Element	Value/remark
Downlink information common for all radio links - CHOICE mode - SSDT information - S field - Code Word Set	FDD 2 short
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - SSDT Cell Identity	FDD a

RADIO BEARER SETUP for Test 1 and Test 2

Information Element	Value/remark
Downlink information common for all radio links - CHOICE mode - SSDT information - S field - Code Word Set	FDD 1 long
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - SSDT Cell Identity	FDD a

RADIO BEARER SETUP for Test 3 and Test 4

Information Element	Value/remark
Downlink information common for all radio links - CHOICE mode - SSDT information - S field - Code Word Set	FDD 2 short
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - SSDT Cell Identity	FDD a

Table 7.6.3.3B: Message Contents of ACTIVESET UPDATE message

ACTIVESET UPDATE for Test 1 and Test 2

Information Element/Group name	Value/Remark	Version
Message Type (10.2.17)		
UE information elements - RRC transaction identifier - Integrity check info -message authentication code -RRC message sequence number - Activation time - New U-RNTI	0 SS calculates the value of MAC-I for this message and writes to this IE. The first/ leftmost bit of the bit string contains the most significant bit of the MAC-I. SS provides the value of this IE, from its internal counter. "now". Not Present	
CN information elements - CN Information info	Not Present	
PhyCH information elements Uplink radio resources - Maximum allowed UL TX power	33 dBm	
Downlink radio resources - Radio link addition information - Radio link addition information - Primary CPICH info - Downlink DPCH info for each RL	1 Same as defined in Cell2	
- CHOICE mode - Primary CPICH usage for channel estimation - DPCH frame offset - Secondary CPICH info	FDD Primary CPICH may be used This should be reflected by the IE" Cell synchronisation information" in received MEASUREMENT REPORT message Not Present	
- DL channelisation code - Secondary scrambling code - Spreading factor - Code number - Scrambling code change - TPC combination index - SS DT Cell Identity - Closed loop timing adjustment mode - TFCI combining indicator - SCCPCH Information for FACH - Radio link removal information - TX Diversity Mode	Not Present 128 96 No code change 0 b Not Present FALSE Not Present Not Present None	R99 and Rel-4 only
- SS DT information - S field - Code Word Set	1 long	

ACTIVESET UPDATE for Test 3 and Test 4

Information Element/Group name	Value/Remark	Version
Message Type (10.2.17)		
UE information elements - RRC transaction identifier - Integrity check info - message authentication code - RRC message sequence number - Activation time - New U-RNTI	0 SS calculates the value of MAC-I for this message and writes to this IE. The first/ leftmost bit of the bit string contains the most significant bit of the MAC-I. SS provides the value of this IE, from its internal counter. "now". Not Present	
CN information elements - CN Information info	Not Present	
PhyCH information elements Uplink radio resources - Maximum allowed UL TX power	33 dBm	
Downlink radio resources - Radio link addition information - Radio link addition information - Primary CPICH info - Downlink DPCH info for each RL	1 Same as defined in Cell2	
- CHOICE mode - Primary CPICH usage for channel estimation - DPCH frame offset - Secondary CPICH info	FDD Primary CPICH may be used This should be reflected by the IE" Cell synchronisation information" in received MEASUREMENT REPORT message Not Present	
- DL channelisation code - Secondary scrambling code - Spreading factor - Code number - Scrambling code change - TPC combination index - SS DT Cell Identity - Closed loop timing adjustment mode - TFCI combining indicator - SCCPCH Information for FACH - Radio link removal information - TX Diversity Mode	Not Present 128 96 No code change 0 b Not Present FALSE Not Present Not Present None	R99 and Rel-4 only
- SS DT information - S field - Code Word Set	2 short	

7.6.3.4.2 Procedure

Measure BLER in points specified in table 7.6.3.4.

7.6.3.5 Test Requirements

For the parameters specified in table 7.6.3.4 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.6.3.5.

Table 7.6.3.4: DCH parameters in multi-path propagation conditions during SSDT mode (Propagation condition: Case 1)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc}	0,8	-2,2	0,8	0,8	dB
\hat{I}_{or2}/I_{oc}	0,8	0,8	0,8	-2,2	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	12,2	12,2	12,2	kbps
Cell ID code word error ratio in uplink (note)	1	1	1	1	%
Number of FBI bits assigned to "S" Field	1	1	2	2	
Code word Set	Long	Long	Short	Short	
UL DPCCH slot Format	#2		#5		
NOTE: The code word errors are introduced independently in both uplink channels.					

Table 7.6.3.5: DCH requirements in multi-path propagation conditions during SSDT mode

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-5,9 dB	10^{-2}
2	-4,9 dB	10^{-2}
3	-10,4 dB	10^{-2}
4	-9,1 dB	10^{-2}

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.

7.7 Demodulation in Handover conditions

7.7.1 Demodulation of DCH in Inter-Cell Soft Handover (Release 5 and earlier)

7.7.1.1 Definition and applicability

The bit error ratio characteristics of UE is determined during an inter-cell soft handover. During the soft handover a UE receives signals from different Base Stations. A UE has to be able to demodulate two P-CCPCH channels and to combine the energy of DCH channels. Delay profiles of signals received from different Base Stations are assumed to be the same but time shifted by 10 chips.

The receive characteristics of the different channels during inter-cell handover are determined by the Block Error Ratio (BLER) values.

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE. This test is applicable for Release 5 and earlier releases only.

7.7.1.2 Minimum requirements

For the parameters specified in table 7.7.1.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.7.1.2.

Table 7.7.1.1: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc} and \hat{I}_{or2}/I_{oc}	0	0	3	6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.7.1.2: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-15,2 dB	10^{-2}
2	-11,8 dB	10^{-1}
	-11,3 dB	10^{-2}
3	-9,6 dB	10^{-1}
	-9,2 dB	10^{-2}
4	-6,0 dB	10^{-1}
	-5,5 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.7.1.1.

7.7.1.3 Test purpose

To verify that the BLER does not exceed the value at the $DPCH_E_c/I_{or}$ specified in table 7.7.1.2.

7.7.1.4 Method of test

7.7.1.4.1 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.

7.7.1.4.2 Procedures

- 1) Connect the SS, multi-path fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.11. In case of UE-receive diversity connect according to figure A.24.
- 2) Set up the call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2.
- 3) Set the test parameters for test 1-4 as specified in table 7.7.1.3.
- 4) Count, at the SS, the number of information blocks transmitted and the number of correctly received information blocks at the UE.
- 5) Measure BLER of DCH channel.

7.7.1.5 Test requirements

For the parameters specified in table 7.7.1.3 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.7.1.4.

Table 7.7.1.3: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc} and \hat{I}_{or2}/I_{oc}	0,6	0,6	3,6	6,6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.7.1.4: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-15,1 dB	10^{-2}
2	-11,7 dB	10^{-1}
	-11,2 dB	10^{-2}
3	-9,5 dB	10^{-1}
	-9,1 dB	10^{-2}
4	-5,9 dB	10^{-1}
	-5,4 dB	10^{-2}

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.

7.7.1A Demodulation of DCH in Inter-Cell Soft Handover (Release 6 and later)

7.7.1A.1 Definition and applicability

The bit error ratio characteristics of UE is determined during an inter-cell soft handover. During the soft handover a UE receives signals from different Base Stations. A UE has to be able to demodulate two P-CCPCH channels and to combine the energy of DCH channels. Delay profiles of signals received from different Base Stations are assumed to be the same but time shifted by 10 chips.

The receive characteristics of the different channels during inter-cell handover are determined by the Block Error Ratio (BLER) values.

The UE shall be tested only according to the data rate, supported. The data-rate-corresponding requirements shall apply to the UE. This test is applicable for Release 6 and later releases only.

7.7.1A.2 Minimum requirements

For the parameters specified in table 7.7.1A.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.7.1A.2.

Table 7.7.1A.1: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc} and \hat{I}_{or2}/I_{oc}	0	0	3	6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.7.1A.2: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

Test Number	$\frac{DPCH_Ec}{I_{or}}$	BLER
1	-15,2 dB	10^{-2}
2	-11,8 dB	10^{-1}
	-11,3 dB	10^{-2}
3	-9,9 dB	10^{-1}
	-9,5 dB	10^{-2}
4	-6,3 dB	10^{-1}
	-5,8 dB	10^{-2}

The reference for this requirement is TS 25.101 [1] clause 8.7.1A.1.

7.7.1A.3 Test purpose

To verify that the BLER does not exceed the value at the $DPCH_Ec/I_{or}$ specified in table 7.7.1A.2.

7.7.1A.4 Method of test

7.7.1A.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.

7.7.1A.4.2 Procedures

- 1) Connect the SS, multi-path fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.11. In case of UE-receive diversity connect according to figure A.24.
- 2) Set up the call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2.
- 3) Set the test parameters for test 1-4 as specified in table 7.7.1A.3.
- 4) Count, at the SS, the number of information blocks transmitted and the number of correctly received information blocks at the UE.
- 5) Measure BLER of DCH channel.

7.7.1A.5 Test requirements

For the parameters specified in table 7.7.1A.3 the average downlink $\frac{DPCH_Ec}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in table 7.7.1A.4.

Table 7.7.1A.3: DCH parameters in multi-path propagation conditions during Soft Handoff (Case 3)

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Phase reference	P-CPICH				
\hat{I}_{or1}/I_{oc} and \hat{I}_{or2}/I_{oc}	0,6	0,6	3,6	6,6	dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2	64	144	384	kbps

Table 7.7.1A.4: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER
1	-15,1 dB	10^{-2}
2	-11,7 dB	10^{-1}
	-11,2 dB	10^{-2}
3	-9,8 dB	10^{-1}
	-9,4 dB	10^{-2}
4	-6,2 dB	10^{-1}
	-5,7 dB	10^{-2}

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.

7.7.2 Combining of TPC commands from radio links of different radio link sets

7.7.2.1 Definition and applicability

When a UE is in soft handover, multiple TPC commands may be received in each slot from different cells in the active set. In general, the TPC commands transmitted in the same slot in the different cells may be different and need to be combined to give TPC_cmd as specified in TS 25.214 [5], in order to determine the required uplink power step.

The requirements and this test apply to all types of UTRA for the FDD UE.

7.7.2.2 Minimum requirements

Test parameters are specified in table 7.7.2.1. The delay profiles of the signals received from the different cells are the same but time-shifted by 10 chips.

For Test 1, the sequence of uplink power changes between adjacent slots shall be as shown in table 7.7.2.2 over the 4 consecutive slots more than 99% of the time. Note that this case is without an additional noise source I_{oc} .

For Test 2, the Cell1 and Cell2 TPC patterns are repeated a number of times. If the transmitted power of a given slot is increased compared to the previous slot, then a variable "Transmitted power UP" is increased by one, otherwise a variable "Transmitted power DOWN" is increased by one. The requirements for "Transmitted power UP" and "Transmitted power DOWN" are shown in table 7.7.2.3.

Table 7.7.2.1: Parameters for TPC command combining

Parameter	Test 1	Test 2	Unit
Phase reference	P-CPICH		-
DPCH_Ec/I _{or}	-12		dB
\hat{I}_{or1} and \hat{I}_{or2}	-60		dBm / 3,84 MHz
I_{oc}	-	-60	dBm / 3,84 MHz
Power-Control-Algorithm	Algorithm 1		-
Cell 1 TPC commands over 4 slots	{0,0,1,1}		-
Cell 2 TPC commands over 4 slots	{0,1,0,1}		-
Information Data Rate	12,2		Kbps
Propagation condition	Static without AWGN source I_{oc}	Multi-path fading case 3	-

Table 7.7.2.2: Requirements for Test 1

Test Number	Required power changes over the 4 consecutive slots
1	Down, Down, Down, Up

Table 7.7.2.3: Requirements for Test 2

Test Number	Ratio (Transmitted power UP) / (Total number of slots)	Ratio (Transmitted power DOWN) / (Total number of slots)
2	≥0,25	≥0,5

The reference for this requirement is TS 25.101 [1] clause 8.7.2.1.

7.7.2.3 Test purpose

To verify that the combining of TPC commands received in soft handover results in TPC_cmd being derived so as to meet the requirements stated in tables 7.7.2.2 and 7.7.2.3.

7.7.2.4 Method of test

7.7.2.4.1 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 two SS's to the UE antenna connector as shown in figure A.13. In case of UE-receive diversity connect according to figure A.27. In case of UE-receive diversity connect according to figure A.27. In test 1 the AWGN generators in figure A.13 and A.27 are switched off.
- 2) Set the test parameters as specified in table 7.7.2.4 for Test 1.
- 3) Set up a call according to the Generic Call Setup procedure TS34.108 [3] sub clause 7.3.2.
- 4) Signal the uplink DPCCH power control parameters to use Algorithm 1 and a step size of 1dB.
- 5) Enter the UE into loopback test mode and start the loopback test.

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

7.7.2.4.2 Procedures

- 1) Before proceeding with paragraph (2), set the output power of the UE to be in the range -10 ± 9 dBm. This may be achieved by setting the downlink signal (\hat{I}_{Or}) to yield an appropriate open loop output power and/or by generating suitable downlink TPC commands from the SSs.
- 2) Send the following sequences of TPC commands in the downlink from each SS over a period of 5 timeslots:

	Downlink TPC commands				
	Slot #0	Slot #1	Slot #2	Slot #3	Slot #4
SS1	0	0	0	1	1
SS2	0	0	1	0	1

- 3) Measure the mean output power of the UE in timeslots # 0, 1, 2, 3 and 4, not including the 25 μ s transient periods at the start and end of each slot.
- 4) Repeat steps 1) to 3) according to Annex F.6.2 Table F.6.2.8.
- 5) End test 1 and disconnect UE.
- 6) Connect two SS's and an AWGN source to the UE antenna connector as shown in figure A.11. In case of UE-receive diversity connect according to figure A.24.

- 5) The sequence of test requirements 1-4 shall be fulfilled more than 99% of the time.
- 6) At the end of the test, "Transmitted power UP" shall be greater than or equal to 1443(23.36% of Total number of slots) and "Transmitted power DOWN" shall be greater than or equal to 2971(48.10% of total number of slots).

NOTE 1: The test limits in requirement (6) have been computed to give a confidence level of 99,7 % that a UE which follows the core requirements will pass while meeting the minimum test duration in Annex F table F.6.1.6.2 for multi-path fading environments. The number of timeslots has been chosen to get a good compromise between the test time and the risk of passing a bad UE.

NOTE 2: 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.

7.7.3 Combining of reliable TPC commands from radio links of different radio link sets

7.7.3.1 Definition and applicability

When a UE is in soft handover, reliable TPC commands may be received in each slot from different cells in the active set. In general, the TPC commands transmitted in the same slot in the different cells may be different and need to be combined to give TPC_cmd as specified in TS 25.214 [5], in order to determine the required uplink power step.

The requirements and this test apply to all types of UTRA for the FDD UE.

7.7.3.2 Minimum requirements

Test parameters are specified in Table 7.7.3.1. Before the start of the tests, the UE transmit power shall be initialised to -15 dBm. An actual UE transmit power may vary from the target level of -15 dBm due to inaccurate UE output power step.

Test 1 verifies that the UE follows only the reliable TPC commands in soft handover. Test 2 verifies that the UE follows all the reliable TPC commands in soft handover.

During tests 1 and 2 the UE transmit power samples, which are defined as the mean power over one timeslot, shall stay 90% of the time within the range defined in Table 7.7.3.2.

Table 7.7.3.1: Parameters for reliable TPC command combining

Parameter	Unit	Test 1	Test 2
Phase reference	-	P-CPICH	
DPCH_Ec/lor1	dB	Note 1	Note 1 & Note 3
DPCH_Ec/lor2	dB	DPCH_Ec/lor1 - 10	DPCH_Ec/lor1 + 6
DPCH_Ec/lor3	dB	DPCH_Ec/lor1 - 10	-
I_{or1}/I_{oc}	dB	-1	-1
I_{or2}/I_{oc}	dB	-1	-1
I_{or3}/I_{oc}	dB	-1	-
I_{oc}	dBm/3.84 MHz	-60	
Power-Control-Algorithm	-	Algorithm 1	
Cell 1 TPC commands	-	Note 2	Note 2
Cell 2 TPC commands	-	"1"	"1"
Cell 3 TPC commands	-	"1"	-
Information data Rate	Kbps	12.2	
Propagation condition	-	Static	
Note 1: The DPCH_Ec/lor1 is set at the level corresponding to 5% TPC error rate.			
Note 2: The uplink power control from cell1 shall be such that the UE transmit power would stay at -15 dBm.			
Note 3: The maximum DPCH_Ec/lor1 level in cell1 is -9 dB.			

Table 7.7.3.2: Test requirements for reliable TPC command combining

Parameter	Unit	Test 1	Test 2
UE output power	dBm	-15 ± 5 dB	-15 ± 3 dB

The reference for this requirement is TS 25.101 [1] clause 8.7.3.1.

7.7.3.3 Test purpose

To verify that the combining of reliable TPC commands received in soft handover results in TPC_cmd being derived so as to meet the requirements stated in tables 7.7.3.2 and 7.7.3.3.

7.7.3.4 Method of test

7.7.3.4.1 Test 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 three SS's to the UE antenna connector as shown in figure A.18. In case of UE-receive diversity connect according to figure A.28.
- 2) Activate Cell 1.

7.7.3.4.2 Test 1 Procedures

- 1) Set up a call according to the Generic Call Setup procedure TS34.108 [3] sub clause 7.3.2. Signal the uplink DPCH power control parameters to use Algorithm 1 and a step size of 1dB. Enter the UE into loopback test mode and start the loopback test.
- 2) Activate the other two cells (Cell 2 and Cell 3) on the other SS's.
- 3) Set the test parameters as specified in table 7.7.3.3 for Test 1.
- 4) The downlink DPCH E_c/I_{or1} level is adjusted so that $5 \pm 1\%$ downlink TPC error is maintained from E_c/I_{or1} . Cell 1 transmits a known pattern of TPC commands and for each slot detect the power step. Thereby the TPC error rate can be measured. The downlink DPCH E_c/I_{or1} is adjusted so that the TPC error rate is equal to $5 \pm 1\%$.
- 5) Send power control commands to the UE until the UE output power measured by Test System is adjusted to the specified power level with ± 1.5 dB tolerance due to power control step size.
- 6) Set up the UE in soft handover between Cell 1, Cell 2 and Cell 3. The downlink TPC commands from Cell 2 and Cell 3 shall continuously have the value "1" during the test while Cell 1 use the UE Output power = -15 dBm as the power control target.
- 7) The DPCH E_c/I_{or2} and DPCH E_c/I_{or3} are adjusted to be 10 dB lower than DPCH_ E_c/I_{or1} .
- 8) Measure the mean output power of the UE, not including the 25 μ s transient periods at the start and end of each slot.
- 9) Repeat step 8) according to Annex F.6.2 Table F.6.2.8.
- 10) End test 1 and disconnect UE.

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

7.7.3.4.3 Test 2 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 two SS's to the UE antenna connector as shown in figure A.13. In case of UE-receive diversity connect according to figure A.27.
- 2) Activate Cell 1.

7.7.3.4.4 Test 2 Procedures

- 1) Set up a call according to the Generic Call Setup procedure TS34.108 [3] sub clause 7.3.2. Signal the uplink DPCH power control parameters to use Algorithm 1 and a step size of 1dB. Enter the UE into loopback test mode and start the loopback test.
- 2) Activate the other cell (Cell 2) on the other SS
- 3) Set the test parameters as specified in table 7.7.3.3 for Test 2.
- 4) The downlink DPCH E_c/I_{or1} level is adjusted so that $5 \pm 1\%$. downlink TPC error is maintained from E_c/I_{or1} . Cell 1 transmits a known pattern of TPC commands and for each slot detect the power step. Thereby the TPC error rate can be measured. The downlink DPCH E_c/I_{or1} is adjusted so that the TPC error rate is equal to $5 \pm 1\%$.
- 5) Send power control commands to the UE until the UE output power measured by Test System is adjusted to the specified power level with ± 1.5 dB tolerance due to power control step size.
- 6) Set up the UE in soft handover between Cell 1 and Cell 2. The downlink TPC commands from Cell 2 shall continuously have the value "1" during the test while Cell 1 use the UE Output power = -15 dBm as the power control target.
- 7) The DPCH E_c/I_{or2} is adjusted to be 6 dB higher than DPCH_ E_c/I_{or1} .
- 8) Measure the mean output power of the UE, not including the 25 μ s transient periods at the start and end of each slot.
- 9) Repeat step 8) according to Annex F.6.2 Table F.6.2.8.
- 10) End test 2 and disconnect UE.

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

7.7.3.5 Test requirements

Test parameters are specified in Table 7.7.3.3. Before the start of the tests, the UE transmit power shall be initialised to -15 dBm. An actual UE transmit power may vary from the target level of -15 dBm due to inaccurate UE output power step.

Table 7.7.3.3: Parameters for reliable TPC command combining

Parameter	Unit	Test 1	Test 2
Phase reference	-	P-CPICH	
DPCH_ E_c/I_{or1}	dB	Note 1	Note 1 & Note 3
DPCH_ E_c/I_{or2}	dB	DPCH_ E_c/I_{or1} - 10	DPCH_ E_c/I_{or1} + 6
DPCH_ E_c/I_{or3}	dB	DPCH_ E_c/I_{or1} - 10	-
I_{or1}/I_{oc}	dB	-1	-1
I_{or2}/I_{oc}	dB	-1	-1
I_{or3}/I_{oc}	dB	-1	-
I_{oc}	dBm/3.84 MHz	-60	
Power-Control-Algorithm	-	Algorithm 1	
Cell 1 TPC commands	-	Note 2	Note 2
Cell 2 TPC commands	-	"1"	"1"
Cell 3 TPC commands	-	"1"	-
Information data Rate	Kbps	12.2	
Propagation condition	-	Static	
NOTE 1: The DPCH_ E_c/I_{or1} is configured to a level such that the TPC error rate is set to $5 \pm 1\%$ (with 95% confidence).			
NOTE 2: The uplink power control from cell1 shall be such that the UE transmit power would stay at -15 dBm.			
NOTE 3: The maximum DPCH_ E_c/I_{or1} level in cell1 is -9 dB.			

NOTE 1: 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.

- 1) In step 8) of clause 7.7.3.4.2, the UE transmit power samples, which are defined as the mean power over one timeslot, shall stay 90% of the time within the range defined in Table 7.7.3.2.
- 2) In step 8) of clause 7.7.3.4.4, the UE transmit power samples, which are defined as the mean power over one timeslot, shall stay 90% of the time within the range defined in Table 7.7.3.2.

7.8 Power control in downlink

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink. If a BLER target has been assigned to a DCCH (See clause C.3), then it has to be such that outer loop is based on DTCH and not on DCCH.

Note: The above implies that the BLER target for the DCCH should be set low enough so that it does not dominate the one for the DTCH.

The minimum requirements in this subclause were derived with the assumption that the UTRAN responds immediately to the uplink TPC commands by adjusting the power of the first pilot field of the DL DPCCCH that commences after end of the received TPC command.

However, for downlink power control tests introduced to the specifications in Release 99, Release 4 and Release 5, (and for those same tests that exist unmodified in Release 6 and later releases), it is permitted to use an SS implementation which has an additional one slot delay in responding to TPC commands. In such cases, there are two sets of test requirements and the choice of which set to use is a function only of the implementation of the SS and not a function of the UE.

NOTE: The additional delay in TPC response time shifts the expected UE performance. Simulations have predicted the expected change and rather than provide two alternative minimum requirements, for convenience the change in expected performance is covered by altering the test tolerance. This change in test tolerance does not imply the alternative implementation is less accurate.

NOTE: The possibility of removing the alternative test method for release 7 and later is for further study. If an SS implementation is upgraded to use the immediate TPC response time it will be necessary to modify the test implementation to use the applicable test requirements.

7.8.1 Power control in the downlink, constant BLER target (Release 5 and earlier)

7.8.1.1 Definition and applicability

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink. If a BLER target has been assigned to a DCCH (See clause C.3), then it has to be such that outer loop is based on DTCH and not on DCCH. The requirements and this test apply to all types of UTRA for the FDD UE for Release 5 and earlier releases.

7.8.1.2 Minimum requirements

For the parameters specified in table 7.8.1.1 the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in table 7.8.1.2 more than 90% of the time. BLER shall be as shown in table 7.8.1.2. Power control in downlink is ON during the test.

Table 7.8.1.1: Test parameter for downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
\hat{I}_{or}/I_{oc}	9	-1	dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2		kbps
Target quality on DTCH	0,01		BLER
Propagation condition	Case 4		
Maximum_DL_Power (note)	7		dB
Minimum_DL_Power (note)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-
NOTE: Power is compared to P-CPICH as specified in [9].			

Table 7.8.1.2: Requirements in downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
$\frac{DPCH_E_c}{I_{or}}$	-16,0	-9,0	dB
Measured quality on DTCH	0,01 ± 30 %	0,01 ± 30 %	BLER

The reference for this requirement is TS 25.101 [1] clause 8.8.1.1.

7.8.1.3 Test purpose

To verify that the UE receiver is capable of converging to required link quality set by network while using as low power as possible.

7.8.1.4 Method of test

7.8.1.4.1 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 SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH.
- 3) RF parameters are set up according to table 7.8.1.3.
- 4) Enter the UE into loopback test mode and start the loopback test.
- 5) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used.

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

7.8.1.4.2 Procedure

- 1) After call set up, the SS waits 15 seconds.
- 2) After this period, BLER is measured. Simultaneously the downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio averaged over one slot is measured.

7.8.1.5 Test Requirements

The test parameters are specified in table 7.8.1.3.

Table 7.8.1.3: Test parameter for downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
\hat{I}_{or}/I_{oc}	9,6	-0,4	dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2		kbps
Target quality on DTCH	0,01		BLER
Propagation condition	Case 4		
Maximum_DL_Power (note)	7		dB
Minimum_DL_Power (note)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-
NOTE: Power is compared to P-CPICH as specified in [9].			

- a) The measured quality on DTCH does not exceed the values in table 7.8.1.4 for SS supporting immediate TPC response time or the values in 7.8.1.4A for SS supporting an additional one slot delay in TPC response time. BLER measurements shall be performed according to the statistical testing in Annex F.6.1.10.
- b) The downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio values, which are averaged over one slot, shall be below the values in table 7.8.1.4 more than 90 % of the time for SS supporting immediate TPC response time or the values in 7.8.1.4A for SS supporting an additional one slot delay in TPC response time.

Table 7.8.1.4: Requirements in downlink power control, constant BLER target

Parameter	Test 1	Test 2	Unit
$\frac{DPCH - E_c}{I_{or}}$	-15,9	-8,9	dB
Measured quality on DTCH	0,01 ± 30 %	0,01 ± 30 %	BLER

Table 7.8.1.4A: Requirements in downlink power control, constant BLER target using SS with an additional one slot delay in power control response time

Parameter	Test 1	Test 2	Unit
$\frac{DPCH - E_c}{I_{or}}$	-15,6	-8,7	dB
Measured quality on DTCH	0,01 ± 30 %	0,01 ± 30 %	BLER

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.

7.8.1A Power control in the downlink, constant BLER target (Release 6 and later)

7.8.1A.1 Definition and applicability

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink. If a BLER target has been assigned to a DCCH (See clause C.3), then it has to be such that outer loop is based on DTCH and not on DCCH. The requirements and this test apply to Release 6 and later release for all types of UTRA for the FDD UE.

7.8.1A.2 Minimum requirements

For the parameters specified in table 7.8.1A.1 the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in table 7.8.1A.2 more than 90% of the time. BLER shall be as shown in table 7.8.1A.2. Power control in downlink is ON during the test.

Table 7.8.1A.1: Test parameter for downlink power control, constant BLER target

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
\hat{I}_{or}/I_{oc}	9	-1	4	9	dB
I_{oc}			-60		dBm / 3,84 MHz
Information Data Rate	12.2		64		kbps
Reference channel (See clause C.3)	C.3.1		C.3.5		-
Target quality on DTCH	0.01		0.1	0.001	BLER
Target quality on DCCH	-		0.1	0.1	BLER
Propagation condition		Case 4			
Maximum_DL_Power (note)		7			dB
Minimum_DL_Power (note)		-18			dB
DL Power Control step size, Δ_{TPC}		1			dB
Limited Power Increase		"Not used"			-

NOTE: Power is compared to P-CPICH as specified in [9].

Table 7.8.1A.2: Requirements in downlink power control, constant BLER target

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
$\frac{DPCH_E_c}{I_{or}}$	-16,0	-9,0	-9,0	-10,3	dB
Measured quality on DTCH	0.01 ± 30 %	0.01 ± 30 %	0.1 ± 30 %	0.001 ± 30 %	BLER

The reference for this requirement is TS 25.101 [1] clause 8.8.1.1.

7.8.1A.3 Test purpose

To verify that the UE receiver is capable of converging to required link quality set by network while using as low power as possible.

7.8.1A.4 Method of test

7.8.1A.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. In case of UE-receive diversity connect according to figure A.21.s
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2.

- 3) RF parameters are set up according to table 7.8.1A.3.
- 4) Enter the UE into loopback test mode and start the loopback test.
- 5) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used.

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

7.8.1A.4.2 Procedure

- 1) After call set up, the SS waits 15 seconds.
- 2) After this period, BLER is measured. Simultaneously the downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio averaged over one slot is measured.

7.8.1A.5 Test Requirements

The test parameters are specified in table 7.8.1A.3.

Table 7.8.1A.3: Test parameter for downlink power control, constant BLER target

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
\hat{I}_{or}/I_{oc}	9.6	-0.4	4.6	9.6	dB
I_{oc}		-60			dBm / 3,84 MHz
Information Data Rate	12.2			64	kbps
Reference channel (See clause C.3)	C.3.1			C.3.5	-
Target quality on DTCH	0.01		0.1	0.001	BLER
Target quality on DCCH	-		0.1	0.1	BLER
Propagation condition		Case 4			
Maximum_DL_Power (note)		7			dB
Minimum_DL_Power (note)		-18			dB
DL Power Control step size, Δ_{TPC}		1			dB
Limited Power Increase		"Not used"			-

NOTE: Power is compared to P-CPICH as specified in [9].
Target quality on DCCH as 1(100%) for Test 1 and Test2.

- a) The measured quality on DTCH does not exceed the values in table 7.8.1A.4. BLER measurements shall be performed according to the statistical testing in Annex F.6.1.10.
- b) The downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio values, which are averaged over one slot, shall be below the values in table 7.8.1A.4 more than 90 % of the time.

Table 7.8.1A.4: Requirements in downlink power control, constant BLER target

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
$\frac{DPCH - E_c}{I_{or}}$	-15,9	-8,9	-8,9	-10,2	dB
Measured quality on DTCH	0.01 ± 30 %	0.01 ± 30 %	0.1 ± 30 %	0.001 ± 30 %	BLER

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.

7.8.2 Power control in the downlink, initial convergence

7.8.2.1 Definition and applicability

This requirement verifies that DL power control works properly during the first seconds after DPCH connection is established. The requirements and this test apply to all types of UTRA for the FDD UE.

7.8.2.2 Minimum requirements

For the parameters specified in table 7.8.2.1 the downlink DPCH_Ec/Ior power ratio measured values, which are averaged over 50 ms, shall be within the range specified in table 7.8.2.2 more than 90 % of the time. T1 equals to 500 ms and it starts 10 ms after the uplink DPDCH physical channel is considered established. T2 equals to 500 ms and it starts when T1 has expired. Power control is ON during the test.

The first 10 ms shall not be used for averaging, i.e. the first sample to be input to the averaging filter is at the beginning of T1. The averaging shall be performed with a sliding rectangular window averaging filter. The window size of the averaging filter is linearly increased from 0 up to 50 ms during the first 50 ms of T1, and then kept equal to 50ms.

Table 7.8.2.1: Test parameters for downlink power control, initial convergence

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Target quality value on DTCH	0,01	0,01	0,1	0,1	BLER
Initial DPCH_Ec/Ior	-5,9	-25,9	-3	-22,8	dB
Information Data Rate	12,2	12,2	64	64	kbps
\hat{I}_{or}/I_{oc}	-1				dB
I_{oc}	-60				dBm/3,84 MHz
Propagation condition	Static				
Maximum_DL_Power (note)	7				dB
Minimum_DL_Power (note)	-18				dB
DL Power Control step size, Δ_{TPC}	1				dB
Limited Power Increase	"Not used"				
NOTE: Power is compared to P-CPICH as specified in [9].					

Table 7.8.2.2: Requirements in downlink power control, initial convergence

Parameter	Test 1 and Test 2	Test 3 and Test 4	Unit
$\frac{DPCH_E_c}{I_{or}}$ during T1	$-18,9 \leq DPCH_Ec/Ior \leq -11,9$	$-15,1 \leq DPCH_Ec/Ior \leq -8,1$	dB
$\frac{DPCH_E_c}{I_{or}}$ during T2	$-18,9 \leq DPCH_Ec/Ior \leq -14,9$	$-15,1 \leq DPCH_Ec/Ior \leq -11,1$	dB

NOTE: The low limit is decreased by 3 dB for a UE with more than one antenna connector.

The reference for this requirement is TS 25.101 [1] clause 8.8.2.1.

NOTE: DTCH shall be transmitted during the whole test.

7.8.2.3 Test purpose

To verify that DL power control works properly during the first seconds after DPCH connection is established.

7.8.2.4 Method of test

7.8.2.4.1 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 SS and an AWGN source to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26.

7.8.2.4.2 Procedure

- 1) Enter the UE into loopback test mode according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH. System simulator shall activate power control at the activation time of the Radio Bearer Setup message (At RRC connection setup only DCCH is established). The uplink DPCH physical channel is considered established at the activation time of the Radio Bearer Setup message.
- 2) RF parameters are set up according to table 7.8.2.3 for the test running. After the transmission of Radio Bearer Setup message, Initial DPCH_Ec/I_{or} is set to the specified level at the activation time.
- 3) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used.
- 4) Measure $\frac{DPCH_E_c}{I_{or}}$ power ratio averaged over 50 ms during T1. T1 starts 10 ms after the uplink DPDCH physical channel is considered established and T1 equals to 500 ms. The first 10 ms shall not be used for averaging, i.e. the first sample to be input to the averaging filter is at the beginning of T1. The averaging shall be performed with a sliding rectangular window averaging filter. The window size of the averaging filter is linearly increased from 0 up to 50 ms during the first 50 ms of T1, and then kept equal to 50ms. At the first slot where the averaging window crosses the T1 - T2 boundary, the average power level within the window begins to test against the T2 requirements.
- 5) Measure $\frac{DPCH_E_c}{I_{or}}$ power ratio averaged over 50 ms during T2. T2 starts, when T1 has expired and T2 equals to 500 ms.

The reception of the "RB setup complete" and the "CLOSE UE TEST LOOP COMPLETE" messages is not necessary to pass this test.

7.8.2.5 Test Requirements

The test parameters are specified in table 7.8.2.3.

Table 7.8.2.3: Test parameters for downlink power control, initial convergence

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Target quality value on DTCH	0,01	0,01	0,1	0,1	BLER
Initial DPCH_Ec/I _{or}	-5,9	-25,9	-3	-22,8	dB
Down Link Information Data Rate	12,2	12,2	64	64	kbps
Up Link Information Data Rate	12,2 Note 2	12,2 Note 2	12,2 Note 3	12,2 Note 3	kbps
\hat{I}_{or}/I_{oc}	-1				dB
I_{oc}	-60				dBm/3,84 MHz
Propagation condition	Static				
Maximum_DL_Power (note 1)	7				dB
Minimum_DL_Power (note 1)	-18				dB
DL Power Control step size, Δ_{TPC}	1				dB
Limited Power Increase	"Not used"				
NOTE 1: Power is compared to P-CPICH as specified in [9].					
NOTE 2: UL TM AU XMC 12.2 kbps, no CRC. See C.6.3.					
NOTE 3: UL AM AU XMC 12.2 kbps. See C.6.7.					

- a) The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio values shall be within the range specified in table 7.8.2.4 during T1 more than 90 % of the time or, when using an SS with an additional one slot delay in power control response, within the range specified in table 7.8.2.4A during T1 more than 90 % of the time.

- b) The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio values shall be within the range specified in table 7.8.2.4 during T2 more than 90 % of the time or, when using an SS with an additional one slot delay in power control response, within the range specified in table 7.8.2.4A during T2 more than 90 % of the time.

Table 7.8.2.4: Requirements in downlink power control, initial convergence

Parameter	Test 1 and Test 2	Test 3 and Test 4	Unit
$\frac{DPCH_E_c}{I_{or}}$ during T1	$-19,5 \leq DPCH_Ec/lor \leq -11,3$	$-15,7 \leq DPCH_Ec/lor \leq -7,5$	dB
$\frac{DPCH_E_c}{I_{or}}$ during T2	$-19,5 \leq DPCH_Ec/lor \leq -14,3$	$-15,7 \leq DPCH_Ec/lor \leq -10,5$	dB

NOTE: The low limit is decreased by 3 dB for a UE with more than one antenna connector.

Table 7.8.2.4A: Requirements in downlink power control, initial convergence target using SS with an additional one slot delay in power control response time

Parameter	Test 1 and Test 2	Test 3 and Test 4	Unit
$\frac{DPCH_E_c}{I_{or}}$ during T1	$-19,7 \leq DPCH_Ec/lor \leq -11,1$	$-15,9 \leq DPCH_Ec/lor \leq -7,3$	dB
$\frac{DPCH_E_c}{I_{or}}$ during T2	$-19,7 \leq DPCH_Ec/lor \leq -14,1$	$-15,9 \leq DPCH_Ec/lor \leq -10,3$	dB

NOTE: The low limit is decreased by 3 dB for a UE with more than one antenna connector.

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.

7.8.3 Power control in the downlink, wind up effects (Release 5 and earlier)

7.8.3.1 Definition and applicability

This requirement verifies that, after the downlink maximum power is limited in the UTRAN and it has been released again, the downlink power control in the UE does not have a wind up effect, i.e. the required DL power has increased during time period the DL power was limited. The requirements and this test apply to all types of UTRA for the FDD UE for Release 5 and earlier releases.

7.8.3.2 Minimum requirements

This test is run in three stages where stage 1 is for convergence of the power control loop, in stage two the maximum downlink power for the dedicated channel is limited not to be higher than the parameter specified in table 7.8.3.1. All parameters used in the three stages are specified in table 7.8.3.1. The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, during stage 3 shall be lower than the value specified in table 7.8.3.2 more than 90 % of the time. Power control of the UE is ON during the test.

Table 7.8.3.1: Test parameter for downlink power control, wind-up effects

Parameter	Test 1			Unit
	Stage 1	Stage 2	Stage 3	
Time in each stage	>15	5	0,5	s
\hat{I}_{or}/I_{oc}	5			dB
I_{oc}	-60			dBm/3,84 MHz
Information Data Rate	12,2			kbps
Quality target on DTCH	0,01			BLER
Propagation condition	Case 4			
Maximum_DL_Power (note)	7	-6,2	7	dB
Minimum_DL_Power (note)	-18			dB
DL Power Control step size, Δ_{TPC}	1			dB
Limited Power Increase	"Not used"			-
NOTE:	Power is compared to P-CPICH as specified in [9].			

Table 7.8.3.2: Requirements in downlink power control, wind-up effects

Parameter	Test 1, stage 3	Unit
$\frac{DPCH_E_c}{I_{or}}$	-13,3	dB

The reference for this requirement is TS 25.101 [1] clause 8.8.3.1.

7.8.3.3 Test purpose

To verify that the UE downlink power control does not require too high downlink power during a period after the downlink power is limited by the UTRAN.

7.8.3.4 Method of test

7.8.3.4.1 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, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH.
- 3) Enter the UE into loopback test mode and start the loopback test.

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

7.8.3.4.2 Procedure

- 1) RF parameters are set up according to table 7.8.3.3. Stage 1 is used for the power control to converge and during Stage 2 the maximum downlink power is limited by UTRAN.
- 2) SS will vary the physical channel power in downlink according to the TPC commands from UE during stages 1, 2, and 3. Downlink power control mode (DPC_MODE) 0 shall be used.
- 3) Measure $\frac{DPCH_E_c}{I_{or}}$ power ratio during stage 3 according to table 7.8.3.3.
- 4) Repeat steps 1 - 3 328 times.

NOTE: The number of repetitions (328) is derived from minimum testing time for 3 km/h fading channels (Table F.6.1.6.2; 164 seconds).

7.8.3.5 Test Requirements

The test parameters are specified in table 7.8.3.3.

Table 7.8.3.3: Test parameter for downlink power control, wind-up effects

Parameter	Test 1			Unit
	Stage 1	Stage 2	Stage 3	
Time in each stage	>15	5	0,5	s
\hat{I}_{or}/I_{oc}	5,6			dB
I_{oc}	-60			dBm/3,84 MHz
Information Data Rate	12,2			kbps
Quality target on DTCH	0,01			BLER
Propagation condition	Case 4			
Maximum_DL_Power (note)	7	-6,2	7	dB
Minimum_DL_Power (note)	-18			dB
DL Power Control step size, Δ_{TPC}	1			dB
Limited Power Increase	"Not used"			-
NOTE: Power is compared to P-CPICH as specified in [9].				

The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio values, which are averaged over one slot during stage 3, shall be lower than the level specified in table 7.8.3.4 during stage 3 more than 90 % of the time for SS supporting immediate TPC response time or the values in 7.8.3.4A for SS supporting an additional one slot delay in TPC response time.

Table 7.8.3.4: Requirements in downlink power control, wind-up effects

Parameter	Test 1, stage 3	Unit
$\frac{DPCH_E_c}{I_{or}}$	-13,2	dB

Table 7.8.3.4A: Requirements in downlink power control, wind-up effects with an additional one slot delay in power control response time

Parameter	Test 1, stage 3	Unit
$\frac{DPCH_E_c}{I_{or}}$	-12.9	dB

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.

7.8.3A Power control in the downlink, wind up effects (Release 6 and later)

7.8.3A.1 Definition and applicability

This requirement verifies that, after the downlink maximum power is limited in the UTRAN and it has been released again, the downlink power control in the UE does not have a wind up effect, i.e. the required DL power has increased during time period the DL power was limited. The requirements and this test apply to Release 6 and later release for all types of UTRA for the FDD UE.

7.8.3A.2 Minimum requirements

This test is run in three stages where stage 1 is for convergence of the power control loop. In stage two the maximum downlink power for the dedicated channel is limited not to be higher than the parameter specified in table 7.8.3A.1. All

parameters used in the three stages are specified in table 7.8.3A.1. The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, during stage 3 shall be lower than the value specified in table 7.8.3A.2 more than 90 % of the time. Power control of the UE is ON during the test.

Table 7.8.3A.1: Test parameter for downlink power control, wind-up effects

Parameter	Test 1			Unit
	Stage 1	Stage 2	Stage 3	
Time in each stage	5	5	0,5	S
\hat{I}_{or}/I_{oc}	5			dB
I_{oc}	-60			dBm/3,84 MHz
Information Data Rate	12,2			Kbps
Quality target on DTCH	0,01			BLER
Propagation condition	Case 4			
Maximum_DL_Power (Note 2)	7	$\min(-6,2, P)$ Note 1	7	dB
Minimum_DL_Power (Note 2)	-18			dB
DL Power Control step size, Δ_{TPC}	1			dB
Limited Power Increase	"Not used"			-
<p style="text-align: center;">$\frac{DPCH_E_c}{I_{or}}$</p> <p>NOTE 1: P is the level corresponding to the average $\frac{DPCH_E_c}{I_{or}}$ power ratio - 2 dB compared to the P-CPICH level. The average $\frac{DPCH_E_c}{I_{or}}$ power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts.</p> <p>NOTE 2: Power is compared to P-CPICH as specified in [9].</p>				

Table 7.8.3A.2: Requirements in downlink power control, wind-up effects

Parameter	Test 1, stage 3	Unit
$\frac{DPCH_E_c}{I_{or}}$	-13,3	dB

The reference for this requirement is TS 25.101 [1] clause 8.8.3.1.

7.8.3A.3 Test purpose

To verify that the UE downlink power control does not require too high downlink power during a period after the downlink power is limited by the UTRAN.

7.8.3A.4 Method of test

7.8.3A.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, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2.
- 3) Enter the UE into loopback test mode and start the loopback test. RF parameters are set up according to table

7.8.3A.3. SS waits 15 seconds and then collects the $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, over 10 second period. The average of these $\frac{DPCH_E_c}{I_{or}}$ values is then calculated and 2 dB is subtracted from it to get the power value P, which will then be used during the stage 2 in the test procedure.

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

7.8.3A.4.2 Procedure

- 1) RF parameters are set up according to table 7.8.3A.3. Stage 1 is used for the power control to converge and During Stage 2 the maximum downlink power is limited by UTRAN.
- 2) SS will vary the physical channel power in downlink according to the TPC commands from UE during stages 1, 2, and 3. Downlink power control mode (DPC_MODE) 0 shall be used.

- 3) Measure $\frac{DPCH_E_c}{I_{or}}$ power ratio during stage 3 according to table 7.8.3A.3.
- 4) Repeat steps 1) to 3) 328 times.

NOTE: The number of repetitions (328) is derived from minimum testing time for 3 km/h fading channels (Table F.6.1.6.2; 164 seconds).

Table 7.8.3A.3: Test parameter for downlink power control, wind-up effects

Parameter	Test 1			Unit
	Stage 1	Stage 2	Stage 3	
Time in each stage	5	5	0,5	s
\hat{I}_{or}/I_{oc}	5,6			dB
I_{oc}	-60			dBm/3,84 MHz
Information Data Rate	12,2			kbps
Quality target on DTCH	0,01			BLER
Propagation condition	Case 4			
Maximum_DL_Power (Note 2)	7	min(-6,2, P) Note 1	7	dB
Minimum_DL_Power (Note 2)	-18			dB
DL Power Control step size, Δ_{TPC}	1			dB
Limited Power Increase	"Not used"			-
<p>NOTE 1: P is the level corresponding to the average $\frac{DPCH_E_c}{I_{or}}$ power ratio - 2 dB compared to the P-CPICH level. The average $\frac{DPCH_E_c}{I_{or}}$ power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts.</p> <p>NOTE 2: Power is compared to P-CPICH as specified in [9]. Target quality on DCCH as 1(100%) for Test1.</p>				

The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio values, which are averaged over one slot during stage 3, shall be lower than the level specified in table 7.8.3A.4 during stage 3 more than 90 % of the time.

Table 7.8.3A.4: Requirements in downlink power control, wind-up effects

Parameter	Test 1, stage 3	Unit
$\frac{DPCH_E_c}{I_{or}}$	-13,2	dB

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.

7.8.4 Power control in the downlink, different transport formats

7.8.4.1 Definition and applicability

This requirement verifies that UE outer loop power control has proper behaviour with different transport formats. The requirements and this test apply for Release 5 and later releases to all types of UTRA for the FDD UE.

7.8.4.2 Minimum requirements

Test 1 verifies that UE outer loop power control has proper behaviour with different transport formats.

The downlink reference measurement channel used in this subclause shall have two different transport formats. The different transport formats of the downlink reference measurement channel used shall correspond to the measurement channels specified in Annex C.3.1A. The different transport formats of the uplink reference measurement channel used shall correspond to the measurement channels specified in Annex C.6.3A. The transport format used in downlink reference measurement channel during different stages of the test shall be set according to the information data rates specified in Table 7.8.4.1. During stage 1 a downlink transport format combination using the 12.2kbps information data rate DTCH shall be used, and during stage 2 the downlink transport format combination shall be changed such that a 0kbps information data rate transport format combination is then used.

For the parameters specified in Table 7.8.4.1 the downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 7.8.4.2 more than 90% of the time. BLER shall be as shown in Table 7.8.4.2. Power control in downlink is ON during the test.

Table 7.8.4.1: Parameters for downlink power control in case of different transport formats

Parameter	Unit	Test 1	
		Stage 1	Stage 2
Time in each stage	S	Note 1	Note 1
\hat{I}_{or}/I_{oc}	dB	9	
I_{oc}	dBm/3.84 MHz	-60	
Information Data Rate	Kbps	12.2	0
Quality target on DTCH	BLER	0.01	
Quality target on DCCH	BLER	1	
Propagation condition		Case4	
Maximum_DL_Power	dB	7	
Minimum_DL_Power	dB	-18	
DL Power Control step size, Δ_{TPC}	dB	1	
Limited Power Increase	-	"Not used"	
NOTE 1: The stage lasts until the DTCH quality has converged to the quality target			

NOTE: Power is compared to P-CPICH as specified in [9].

Table 7.8.4.2: Requirements in downlink power control in case of different transport formats

Parameter	Unit	Test 1, stage 1	Test 1, stage 2
$\frac{DPCH_E_c}{I_{or}}$	dB	-16.0	-18.0
Measured quality on DTCH	BLER	0.01±30%	0.01±30%

The reference for this requirement is TS 25.101 [1] clause 8.8.4.1.

7.8.4.3 Test purpose

To verify that the UE outer loop power control works properly with different transport formats.

7.8.4.4 Method of test

7.8.4.4.1 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. In case of UE-receive diversity connect according to figure A.21
- 2) Set up a call according to the Generic call setup procedure specified in TS 34.108 [3] clause 7.3.2, with the exception of the information elements of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH. Downlink power control mode (DPC_MODE) 0 shall be used.
- 3) Enter the UE into loopback test mode 2 and start the loopback test.

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

7.8.4.4.2 Procedure

- 1) RF parameters are set up according to table 7.8.4.3.
- 2) SS will vary the physical channel power in downlink according to the TPC commands from UE during stage 1 and 2.
- 3) Stage 1. The SS waits 15 seconds before it performs the measurement in step 4.
- 4) Measure quality on DTCH according to statistical significance in Annex F.6.1.10 and $\frac{DPCH_E_c}{I_{or}}$ power ratio according to table 7.8.4.3.
- 5) Stage 2. The SS waits 15 seconds before it performs the measurement in step 6.
- 6) Measure quality on DTCH according to statistical significance in Annex F.6.1.10 and $\frac{DPCH_E_c}{I_{or}}$ power ratio according to table 7.8.4.3. Note: The measurement should not start until after power control has converged.

7.8.4.5 Test Requirements

The test parameters are specified in table 7.8.4.3.

Table 7.8.4.3: Parameters for downlink power control in case of different transport formats

Parameter	Unit	Test 1	
		Stage 1	Stage 2
Time in each stage	S	Note 1	Note 1
\hat{I}_{or}/I_{oc}	dB	9.6	
I_{oc}	dBm/3.84 MHz	-60	
Information Data Rate	Kbps	12.2	0
Quality target on DTCH	BLER	0.01	
Quality target on DCCH	BLER	1	
Propagation condition		Case4	
Maximum_DL_Power	dB	7	
Minimum_DL_Power	dB	-18	
DL Power Control step size, Δ_{TPC}	dB	1	
Limited Power Increase	-	"Not used"	
NOTE 1: The stage lasts until the DTCH quality has converged to the quality target.			

NOTE: Power is compared to P-CPICH as specified in [9].

- a) The measured quality on DTCH does not exceed the values in table 7.8.4.4 or in table 7.8.4.5.
- b) The downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio values, which are averaged over one slot, shall be below the values in table 7.8.4.4 more than 90 % of the time for SS supporting immediate power control response time or below the values in 7.8.4.5 for SS supporting an additional one slot delay in power control response time.

Table 7.8.4.4: Requirements in downlink power control in case of different transport formats

Parameter	Unit	Test 1, stage 1	Test 1, stage 2
$\frac{DPCH - E_c}{I_{or}}$	dB	-15.9	-17.9
Measured quality on DTCH	BLER	0.01±30%	0.01±30%

Table 7.8.4.5: Requirements in downlink power control in case of different transport formats with an additional one slot delay in power control response time

Parameter	Unit	Test 1, stage 1	Test 1, stage 2
$\frac{DPCH - E_c}{I_{or}}$	dB	-15.6	-17.7
Measured quality on DTCH	BLER	0.01±30%	0.01±30%

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.

7.8.5 Power control in the downlink for F-DPCH

7.8.5.1 Definition and applicability

Power control in the downlink is the ability of the UE receiver to converge to required link quality set by the network while using as low power as possible in downlink.

The requirements and this test apply to release 6 and later releases for all types of UTRA for the FDD UE that support F-DPCH and HSDPA.

7.8.5.2 Minimum requirements

For the parameters specified in table 7.8.5.1 the downlink $\frac{F - DPCH - E_c}{I_{or}}$ power ratio measured values, which are averaged over TPC symbols of the F-DPCH frame, shall be below the specified value in table 7.8.5.2 more than 90% of the time. TPC Command Error Ratio shall be in the limits given by table 7.8.5.2. Power control in downlink is ON during the test.

Table 7.8.5.1: Test parameter for downlink power control for F-DPCH

Parameter	Test 1	Test 2	Unit
\hat{I}_{or}/I_{oc}	9	-1	dB
I_{oc}	-60		dBm / 3,84 MHz
Spreading Factor (SF)	256		
Target quality value on Fractional DPCH (F-DPCH)	0.01	0.05	
Propagation condition	Case 4		
Maximum_DL_Power (note)	7		dB
Minimum_DL_Power (note)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-
Power Control Algorithm	Algorithm 1		
NOTE: Power is compared to P-CPICH as specified in [9].			

Table 7.8.5.2: Requirements in downlink power control for F-DPCH

Parameter	Test 1	Test 2	Unit
$\frac{F - DPCH - E_c}{I_{or}}$	-15,9	-12,0	dB
TPC Command Error Ratio high	0,015	0,065	-
TPC Command Error Ratio low	0,005	0,035	-

The reference for this requirement is TS 25.101 [1] clause 8.8.1.1.

7.8.5.3 Test purpose

To verify that the UE receiver is capable of converging to required link quality set by network while using as low power as possible.

7.8.5.4 Method of test

7.8.5.4.1 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. In case of UE-receive diversity connect according to figure A.21.
- 2) The Fixed Reference Channels (FRC H-Set 1, QPSK) are specified in Annex C.8.1.1.3) Set up a HSDPA call according to the call setup procedure specified in TS 34.108 [3] clause 7.3.11 with levels according to table E.5C.1.
- 3) Once the HSDPA connection is setup, and start transmitting HSDPA Data.
- 4) Additional RF parameters are set up according to table 7.8.5.3.

- 5) Set the uplink DPCH power control parameters to use Algorithm 1 with a step size of 1 dB and the uplink HS-DPCCH to be continuous.
- 6) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used.

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

7.8.5.4.2 Procedure

- 1) After call set up generate suitable TPC commands from the SS to set the output power of the UE, measured at the UE antenna connector, to be in the range 0 dBm +/- 2 dB. This is a nominal setting and not part of the test requirements.
- 2) SS waits 15 seconds and then sends repetitive UP/DOWN/UP/DOWN TPC pattern to the UE. During the measurements it may be possible that UE output power drifts far away from the nominal setting (0 dBm) due to erroneously received TPC commands. If power drift causes problems for the SS to continue the measurements, then the SS shall send suitable TPC commands to set UE output power back to its nominal setting. Same as the regular UP/DOWN/UP/DOWN TPCs, the deviating TPCs with the corresponding power steps are counted as samples.
- 3) After this period, measure TPC Command Error Rate according to statistical significance in Annex F.6.1.10. This is done as follows: The SS shall measure the mean output power of the UE in each timeslot, not including the 25 μ s transient periods at the start and end of each slot. For each timeslot
 - if TPC command corresponding to this timeslot was UP, and the mean power in that timeslot is greater than or equal to the mean power in the previous timeslot plus 0.4 dB, increment a counter of correct samples. Otherwise increment a counter of wrong samples.
 - if TPC command corresponding to this timeslot was DOWN, and the mean power in that timeslot is less than or equal to the mean power in the previous timeslot minus 0.4 dB, increment a counter of correct samples. Otherwise increment a counter of wrong samples.

Simultaneously the downlink $\frac{F - DPCH - E_c}{I_{or}}$ power ratio averaged over TPC symbols of the F-DPCH frame is measured..

Specific Message Contents

All message indicated above shall use the same content as described in the default message content in clause 9 of TS 34.108 [3] with the following exceptions

RRC CONNECTION REQUEST (Step 2)

Information Element	Value/remark	Version
Message Type		
Support for F-DPCH	TRUE	Rel-6

RADIO BEARER SETUP HSDPA with F-DPCH (Step 2)

Information Element	Value/remark	Version
UL Transport channel information for all transport channels <ul style="list-style-type: none"> - PRACH TFCS - CHOICE Mode - TFC subset - UL DCH TFCS - CHOICE TFCI signalling - TFCI Field 1 information - CHOICE TFCS representation - TFCS complete reconfiguration information - CHOICE CTFC Size - CTFC information - 2bit CTFC - Power offset Information - CHOICE Gain Factors - Reference TFC ID - CHOICE mode - Power offset Pp-m - 2bit CTFC - Power offset Information - CHOICE Gain Factors - CHOICE mode - Gain factor β_c - Gain factor β_d - Reference TFC ID - CHOICE mode - Power offset Pp-m 	Not Present FDD Not Present Normal Complete reconfiguration 2 bit CTFC 2 TFCS 0 computedGainFactors 0 FDD Not Present 1 signalledGainFactors FDD 11 15 0 FDD Not Present	
Uplink DPCH info <ul style="list-style-type: none"> - Uplink DPCH power control info - Δ_{ACK} - Δ_{NACK} - Ack-Nack repetition factor 	5 5 3(required for continuous HS-DPCCH signal)	Rel-6
Downlink HS-PDSCH Information <ul style="list-style-type: none"> - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Information - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - P_{Ohdsch} - CQI Feedback cycle, k - CQI repetition factor - Δ_{CQI} - CHOICE mode 	FDD Not present 2 FDD 3 dB 4 ms 2(required for continuous HS-DPCCH signal) 5 (corresponds to 0dB in relative power offset) FDD (no data)	Rel-6
Downlink information common for all radio links		
- Downlink F-DPCH info common for all RL		Rel-6
- Timing Indication	Maintain	
- Timing maintained Synchronization indicator	FALSE	
- Downlink F-DPCH power control information		
- DPC mode	0 (single)	
- TPC command error rate target	0,01 ± 50 % (Test 1), 0,05 ± 30 % (Test 2)	
Downlink information for each radio link		
- Downlink information for each radio link		
- Choice mode	FDD	
- Primary CPICH info		
- Primary scrambling code	Reference to clause 6.1 "Default settings (FDD)"	
- Serving HS-DSCH radio link indicator	TRUE	Rel-5
- Downlink DPCH info for each RL	Not Present	
- Downlink F-DPCH info for each RL		Rel-6
- Primary CPICH usage for channel estimation	Primary CPICH may be used	

Information Element	Value/remark	Version
- F-DPCH frame offset	Set to value Default DPCH Offset Value (as currently stored in SS) mod 38 400	
- Secondary CPICH info	Not Present	
- Secondary scrambling code	Not Present	
- Code number	12	
- TPC combination index	0	

7.8.5.5 Test Requirements

The test parameters are specified in table 7.8.5.3.

Table 7.8.5.3: Test parameter for downlink power control for F-DPCH

Parameter	Test 1	Test 2	Unit
\hat{I}_{or}/I_{oc}	9,6	-0,4	dB
I_{oc}	-60		dBm / 3,84 MHz
Spreading Factor (SF)	256		
Target quality value on Fractional DPCH (F-DPCH)	0,01	0,05	-
Propagation condition	Case 4		
Maximum_DL_Power (note)	7		dB
Minimum_DL_Power (note)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-
Power Control Algorithm	Algorithm 1		
NOTE: Power is compared to P-CPICH as specified in [9].			

- a) The measured quality on F-DPCH shall be in the limits given by table 7.8.5.4. TPC Command Error Rate shall be performed as specified in TS 25.214 [9].
- b) The downlink $\frac{F-DPCH-E_c}{I_{or}}$ power ratio values, which are averaged over TPC symbols of the F-DPCH frame, shall be below the values in table 7.8.5.4 more than 90 % of the time.

Table 7.8.5.4: Requirements in downlink power control for F- DPCH

Parameter	Test 1	Test 2	Unit
$\frac{F-DPCH-E_c}{I_{or}}$	-15,8	-11,9	dB
TPC Command Error Ratio high	0,015	0,065	-
TPC Command Error Ratio low	0,005	0,035	-

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.

7.9 Downlink compressed mode

Downlink compressed mode is used to create gaps in the downlink transmission, to allow the UE to make measurements on other frequencies.

7.9.1 Single link performance (Release 5 and earlier)

7.9.1.1 Definition and applicability

The receiver single link performance of the Dedicated Traffic Channel (DCH) in compressed mode is determined by the Block Error Ratio (BLER) and transmitted DPCH_Ec/I_{or} power ratio in the downlink. If a BLER target has been assigned to a DCCH (See clause C.3), then it has to be such that outer loop is based on DTCH and not on DCCH.

NOTE: The above implies that the BLER target for the DCCH should be set low enough so that it does not dominate the one for the DTCH.

The compressed mode parameters are given in clause C.5. Tests 1 and 2 are using Set 1 compressed mode pattern parameters from table C.5.1 in clause C.5 while tests 3 and 4 are using Set 2 compressed mode patterns from the same table.

The requirements for compressed mode by spreading factor reduction (tests 1 and 2) apply to all types of UTRA for the FDD UE from Release 5 and earlier releases only. The requirements for compressed mode by puncturing (tests 3 and 4) apply to all types of UTRA for the FDD UE for Release 99 and Release 4 only.

7.9.1.2 Minimum requirements

For the parameters specified in table 7.9.1 the downlink $\frac{DPCH_Ec}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in table 7.9.2 more than 90% of the time. The measured quality on DTCH shall be as required in table 7.9.2.

Downlink power control is ON during the test. Uplink TPC commands shall be error free.

Table 7.9.1: Test parameter for downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Delta SIR1	0	3	0	3	dB
Delta SIR after1	0	3	0	3	dB
Delta SIR2	0	0	0	0	dB
Delta SIR after2	0	0	0	0	dB
\hat{I}_{or}/I_{oc}	9				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2				kbps
Propagation condition	Case 2				
Target quality value on DTCH	0,01				BLER
Maximum DL Power (note)	7				dB
Minimum DL Power (note)	-18				dB
DL Power Control step size, Δ_{TPC}	1				dB
Limited Power Increase	"Not used"				-

NOTE: Power is compared to P-CPICH as specified in [9].

Table 7.9.2: Requirements in downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
$\frac{DPCH_Ec}{I_{or}}$	-14,6	No requirements	-15,2	No requirements	dB
Measured quality of compressed and recovery frames	No requirements	< 0,001	No requirements	< 0,001	BLER
Measured quality on DTCH	0,01 ± 30 %				BLER

The reference for this requirement is TS 25.101 [1] clause 8.9.1.1.

7.9.1.3 Test purpose

The purpose of this test is to verify the reception of DPCH in a UE while downlink is in a compressed mode. The UE needs to preserve the BLER using sufficient low DL power. It is also verified that UE applies the Delta SIR values, which are signalled from network, in its outer loop power control algorithm.

7.9.1.4 Method of test

7.9.1.4.1 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 SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
- 2) Set up a call according to the Generic call setup procedure, specified in TS 34.108 [3] clause 7.3.2, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH..
- 3) RF parameters are set up according to table 7.9.3.
- 4) Set compressed mode parameters according to table C.5.1. Tests 1 and 2 are using Set 1 compressed mode pattern parameters and while tests 3 and 4 are using Set 2 compressed mode pattern parameters.

NOTE: Set 2 is applicable to Release 99 and Release 4 only.

- 5) Enter the UE into loopback test mode and start the loopback test.
- 6) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used. SS response time for UE TPC commands shall be one slot.
- 7) The SS waits 15 seconds before it performs measurements as described in 7.9.1.4.2.

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

7.9.1.4.2 Procedure

- 1) Test 1: Measure quality on DTCH and $\frac{DPCH_E_c}{I_{or}}$ power ratio values averaged over one slot.
- 2) Test 2: Measure quality on DTCH and quality of compressed and recovery frames.
- 3) Test 3: Measure quality on DTCH and $\frac{DPCH_E_c}{I_{or}}$ power ratio values averaged over one slot.
- 4) Test 4: Measure quality on DTCH and quality of compressed and recovery frames.

7.9.1.5 Test requirements

The test parameters are specified in table 7.9.3.

Table 7.9.3: Test parameter for downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
Delta SIR1	0	3	0	3	dB
Delta SIR after1	0	3	0	3	dB
Delta SIR2 (note 2)	0	0	0	0	dB
Delta SIR after2 (note 2)	0	0	0	0	dB
\hat{I}_{or}/I_{oc}	9,6				dB
I_{oc}	-60				dBm / 3,84 MHz
Information Data Rate	12,2				kbps
Propagation condition	Case 2				
Target quality value on DTCH	0,01				BLER
Maximum DL Power (note 1)	7				dB
Minimum DL Power (note 1)	-18				dB
DL Power Control step size, Δ_{TPC}	1				dB
Limited Power Increase	"Not used"				-
NOTE 1: Power is compared to P-CPICH as specified in [9].					
NOTE 2: Delta SIR2 is not present in Test 1, Test 2, Test 3 and Test 4.					

- a) Test 1: The downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio values averaged over one slot shall be below the values in table 7.9.4 more than 90 % of the time. The measured quality on DTCH shall be as required in table 7.9.4. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.
- b) Test 2: Measured quality on DTCH and measured quality of compressed and recovery frames do not exceed the values in table 7.9.4. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.
- c) Test 3: The downlink $\frac{DPCH - E_c}{I_{or}}$ power ratio values averaged over one slot shall be below the values in table 7.9.2 more than 90 % of the time. The measured quality on DTCH shall be as required in table 7.9.4. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.
- d) Test 4: Measured quality on DTCH and measured quality of compressed and recovery frames do not exceed the values in table 7.9.4. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.

Table 7.9.4: Requirements in downlink compressed mode

Parameter	Test 1	Test 2	Test 3	Test 4	Unit
$\frac{DPCH - E_c}{I_{or}}$	-14,5	No requirements	-15,1	No requirements	dB
Measured quality of compressed and recovery frames	No requirements	< 0,001	No requirements	< 0,001	BLER
Measured quality on DTCH	0,01 ± 30 %				BLER

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.

7.9.1A Single link performance (Release 6 and later)

7.9.1A.1 Definition and applicability

The receiver single link performance of the Dedicated Traffic Channel (DCH) in compressed mode is determined by the Block Error Ratio (BLER) and transmitted DPCH_ Ec/Ior power ratio in the downlink. If a BLER target has been assigned to a DCCH (See clause C.3), then it has to be such that outer loop is based on DTCH and not on DCCH.

NOTE: The above implies that the BLER target for the DCCH should be set low enough so that it does not dominate the one for the DTCH.

The compressed mode parameters are given in clause C.5. Test 1 is using Set 2A compressed mode pattern parameters from table C.5.1 and Test 2 is using Set 1 compressed mode patterns from the same table.

The requirements for compressed mode by spreading factor reduction (tests 1 and 2) apply to all types of UTRA for the FDD UE from Release 6 and later releases.

7.9.1A.2 Minimum requirements

For the parameters specified in table 7.9.1A the downlink $\frac{DPCH_Ec}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in table 7.9.2A more than 90% of the time. The measured quality on DTCH shall be as required in table 7.9.2A.

Downlink power control is ON during the test. Uplink TPC commands shall be error free.

Table 7.9.1A: Test parameter for downlink compressed mode

Parameter	Test 1	Test 2	Unit
Delta SIR1	0	3	dB
Delta SIR after1	0	3	dB
Delta SIR2	0	0	dB
Delta SIR after2	0	0	dB
Compressed Mode Patterns	C.5.1 Set 2A	C.5.1 Set 1	dB
\hat{I}_{or}/I_{oc}	9		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2		kbps
Propagation condition	Case 3	Case 2	
Target quality value on DTCH	0,01		BLER
Maximum DL Power (note)	7		dB
Minimum DL Power (note)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-
NOTE : Power is compared to P-CPICH as specified in [9].			

Table 7.9.2A: Requirements in downlink compressed mode

Parameter	Test 1	Test 2	Unit
$\frac{DPCH_Ec}{I_{or}}$	-13.7	No requirements	dB
Measured quality of compressed and recovery frames	No requirements	< 0,001	BLER
Measured quality on DTCH	0,01 ± 30 %		BLER

The reference for this requirement is TS 25.101 [1] clause 8.9.1.1.

7.9.1A.3 Test purpose

The purpose of this test is to verify the reception of DPCH in a UE while downlink is in a compressed mode. The UE needs to preserve the BLER using sufficient low DL power. It is also verified that UE applies the Delta SIR values, which are signalled from network, in its outer loop power control algorithm.

7.9.1A.4 Method of test

7.9.1A.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. In case of UE-receive diversity connect according to figure A.21.
- 2) Set up a call according to the Generic call setup procedure, specified in TS 34.108 [3] clause 7.3.2, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. With this exception, the outer loop is based on DTCH and not on DCCH.
- 3) RF parameters are set up according to table 7.9.3A.
- 4) Set compressed mode parameters according to table C.5.1. Test 1 is using Set 2A compressed mode pattern parameters and test 2 is using Set 1 compressed mode pattern parameters.
- 5) Enter the UE into loopback test mode and start the loopback test.
- 6) SS will vary the physical channel power in downlink according to the TPC commands from UE. Downlink power control mode (DPC_MODE) 0 shall be used. SS response time for UE TPC commands shall be one slot.
- 7) The SS waits 15 seconds before it performs measurements as described in 7.9.1A.4.2.

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

7.9.1A.4.2 Procedure

- 1) Test 1: Measure quality on DTCH and $\frac{DPCH_{-}E_c}{I_{or}}$ power ratio values averaged over one slot.
- 2) Test 2: Measure quality on DTCH and quality of compressed and recovery frames.

7.9.1A.5 Test requirements

The test parameters are specified in table 7.9.3A.

Table 7.9.3A: Test parameter for downlink compressed mode

Parameter	Test 1	Test 2	Unit
Delta SIR1	0	3	dB
Delta SIR after1	0	3	dB
Delta SIR2 (note 2)	0	0	dB
Delta SIR after2 (note 2)	0	0	dB
Compressed Mode Patterns	C.5.1 Set 2A	C.5.1 Set 1	dB
\hat{I}_{or}/I_{oc}	9,6		dB
I_{oc}	-60		dBm / 3,84 MHz
Information Data Rate	12,2		kbps
Propagation condition	Case 3	Case 2	
Target quality value on DTCH	0,01		BLER
Maximum DL Power (note 1)	7		dB
Minimum DL Power (note 1)	-18		dB
DL Power Control step size, Δ_{TPC}	1		dB
Limited Power Increase	"Not used"		-

NOTE 1: Power is compared to P-CPICH as specified in [9].
NOTE 2: Delta SIR2 is not present in Test 1 and Test 2.

- a) Test 1: The downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio values averaged over one slot shall be below the values in table 7.9.4A more than 90 % of the time. The measured quality on DTCH shall be as required in table 7.9.4A. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.
- b) Test 2: Measured quality on DTCH and measured quality of compressed and recovery frames do not exceed the values in table 7.9.4A. BLER measurements based on measured quality on DTCH shall be performed according to the statistical testing in Annex F.6.1.10.

Table 7.9.4A: Requirements in downlink compressed mode

Parameter	Test 1	Test 2	Unit
$\frac{DPCH_E_c}{I_{or}}$	-13.6	No requirements	dB
Measured quality of compressed and recovery frames	No requirements	< 0,001	BLER
Measured quality on DTCH	0,01 ± 30 %		BLER

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.

7.10 Blind transport format detection

7.10.1 Definition and applicability

Performance of Blind transport format detection is determined by the Block Error Ratio (BLER) values and by the measured average transmitted $DPCH_E_c/I_{or}$ value.

7.10.2 Minimum requirements

For the parameters specified in table 7.10.1 the average downlink $\frac{DPCH_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER and FDR shown in table 7.10.2. Table 7.10.3 defines the Transport Format Combinations Set for the downlink. The reference measurement channel used in this test case is defined in Annex C.4.

Table 7.10.1: Test parameters for Blind transport format detection

Parameter	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Unit
\hat{I}_{or}/I_{oc}	-1		-3				dB
I_{oc}	-60						dBm / 3.84 MHz
Information Data Rate	12,2 (rate 1)	7,95 (rate 2)	1,95 (rate 3)	12,2 (rate 1)	7,95 (rate 2)	1,95 (rate 3)	kbps
Propagation condition	static			multi-path fading case 3			-
TFCI	off						-

Table 7.10.2: The Requirements for DCH reception in Blind transport format detection

Test Number	$\frac{DPCH_E_c}{I_{or}}$	BLER	FDR
1	-17,7dB	10^{-2}	10^{-4}
2	-17,8dB	10^{-2}	10^{-4}
3	-18,4dB	10^{-2}	10^{-4}
4	-13,0dB	10^{-2}	10^{-4}
5	-13,2dB	10^{-2}	10^{-4}
6	-13,8dB	10^{-2}	10^{-4}
NOTE: The value of DPCH_Ec/lor, loc, and lor/loc are defined in case of DPCH is transmitted.			

NOTE: In the test, 9 different Transport Format Combinations (table 7.10.3) are sent during the call set up procedure, so that the UE has to detect the correct transport format from these 9 candidates.

Table 7.10.3: Transport format combinations informed during the call set up procedure in the test

	1	2	3	4	5	6	7	8	9
DTCH	12,2 k	10,2 k	7,95 k	7,4 k	6,7 k	5,9 k	5,15 k	4,75 k	1,95 k
DCCH	2,4 k								

7.10.3 Test purpose

To verify the ability of the blind transport format detection 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) and false transport format detection ratio (FDR) not exceeding a specified value.

To verify the ability of the blind transport format detection to receive a predefined test signal, representing a multi-path propagation channel for the wanted and for the co-channel signals from serving and adjacent cells, with a block error ratio (BLER) and false transport format detection ratio (FDR) not exceeding a specified value.

7.10.4 Method of test

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

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

- For test 1-3 connect the SS and AWGN noise source to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26. For test 4-6 connect the SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
- Set up a call according to the Generic call setup procedure TS34.108 [3] sub clause 7.3.2.
- Set the test parameters for test 1-6 as specified table 7.10.4 and table 7.10.5.
- Enter the UE into loopback test mode 2 and start the loopback test.
- In the case of test 4-6, Setup fading simulator as fading condition case 3 which are described in table D.2.2.1.

NOTE: In loopback test mode 2 the UE may return any valid uplink Transport Format Combination.

7.10.4.2 Procedure

Measure BLER and FDR of DCH.

For FDR, the SS shall check the TFI of the UE transmitted transport format to verify that the UE has detected the correct downlink transport format.

In this test TF0 and TF10 on uplink DTCH shall be counted as block errors.

During the measurements downlink DCCH shall be continuously transmitted. When there is no signalling to transmit on downlink DCCH then dummy DCCH transmission as described in Annex C.9 shall be used.

NOTE: The TFCS size used in this test shall be 18 and not 9 as implied by TS 25.101 (and the NOTE above Table 7.10.3). Since the DCCH will be continuously transmitted and the DCCH is not used in the BTFD for the DTCH this does not have an impact on the BTFD performance.

7.10.5 Test requirements

The test parameters are specified in table 7.10.4.

Table 7.10.4: Test parameters for Blind transport format detection

Parameter	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Unit
\hat{I}_{or}/I_{oc}	-0,7			-2,4			dB
I_{oc}	-60						dBm / 3.84 MHz
Information Data Rate	12,2 (rate 1)	7,95 (rate 2)	1,95 (rate 3)	12,2 (rate 1)	7,95 (rate 2)	1,95 (rate 3)	kbps
propagation condition	Static			multi-path fading case 3			-
TFCI	off						-

BLER and FDR shall not exceed the values at the $DPCH_Ec/I_{or}$ specified in table 7.10.5.

Table 7.10.5: The Requirements for DCH reception in Blind transport format detection

Test Number	$\frac{DPCH_Ec}{I_{or}}$	BLER	FDR
1	-17,6dB	10^{-2}	10^{-4}
2	-17,7dB	10^{-2}	10^{-4}
3	-18,3dB	10^{-2}	10^{-4}
4	-12,9dB	10^{-2}	10^{-4}
5	-13,1dB	10^{-2}	10^{-4}
6	-13,7dB	10^{-2}	10^{-4}
NOTE: The value of $DPCH_Ec/I_{or}$, I_{oc} , and I_{or}/I_{oc} are defined in case of DPCH is transmitted.			

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.

7.11 Demodulation of Paging Channel (PCH)

7.11.1 Definition and applicability

The receiver characteristics of paging channel are determined by the probability of missed paging message (P_{m-p}). PCH is mapped into the S-CCPCH and it is associated with the transmission of Paging Indicators (PI) to support efficient sleep-mode procedures.

The requirements and this test apply to all types of UTRA for the FDD UE for Release 4 and later releases.

7.11.2 Minimum requirements

For the parameters specified in table 7.11.1 the average probability of missed paging (P_{m-p}) shall be below the specified value in table 7.11.2. Power of downlink channels other than S-CCPCH and PICH are as defined in Table E.3.3.1 of Annex E. S-CCPCH structure is as defined in Annex C.7.

Table 7.11.1: Parameters for PCH detection

Parameter	Unit	Test 1	Test 2
Number of paging indicators per frame (N_p)	-	72	
Phase reference	-	P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
\hat{I}_{or}/I_{oc}	dB	-1	-3
Propagation condition		Static	Case 3

Table 7.11.2: Test requirements for PCH detection

Test Number	S-CCPCH_Ec/Ior	PICH_Ec/Ior	Pm-p
1	-14.8	-19	0.01
2	-9.8	-12	0.01

The reference for this requirement is TS 25.101 [1] clause 8.12.1.

7.11.3 Test purpose

To verify that average probability of missed paging (P_{m-p}) does not exceed a specified value.

7.11.4 Method of test

7.11.4.1 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) For test 1 connect the SS and AWGN noise source to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26. For test 2 connect the SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.10. In case of UE-receive diversity connect according to figure A.21.
- 2) Set the test parameters for test 1-2 as specified in tables 7.11.3 and 7.11.4. In the case of test 2, Setup fading simulator as fading condition case 3 which are described in table D.2.2.1. Power of downlink channels other than S-CCPCH and PICH are as defined in table E.3.3.1. The S-CCPCH structure is as defined in Annex C.7 and includes 2 S-CCPCH according to TS 34.108 [3] section 6.1.1. The SCCPCH_Ec/Ior for the S-CCPCH carrying FACH is -7.0 dB while the SCCPCH_Ec/Ior for the S-CCPCH carrying PCH is defined in table 7.11.4.

7.11.4.2 Procedure

- 1) The UE is switched on.
- 2) An RRC connection is set up according to the generic set-up procedure specified in TS 34.108 [3] subclause 7.3.3 to place the UE in the CELL_PCH state.
- 3) The SS transmits the Paging type 1 message with used paging identity being a UTRAN identity and including the UE's assigned U-RNTI
- 4) If the UE responds with a CELL UPDATE message within 8 seconds, then a success is recorded. If the UE does not respond with a CELL UPDATE message within 8 seconds, a failure is recorded. On reception of the CELL UPDATE message the SS transmits 3 identical CELL UPDATE CONFIRM messages using CCCH on downlink FACH. Then the SS waits for 3 seconds to allow the UE time to move back to CELL_PCH state.
- 5) Repeat steps 3-4 according to Annex F.6.2 table 6.2.8.

NOTE: In the Step 4 above, the 3 identical CELL UPDATE CONFIRM messages are transmitted with the same RRC message sequence number. Transmitting 3 identical CELL UPDATE CONFIRM messages is done to increase the probability of correct message reception at the UE.

Specific Message Contents

All messages indicated above shall use the same content as described in the default message content in clause 9 of TS 34.108 [3] and clause 6.1.1 based on 6.1.0a.3 SIB default schedule of 34.108 [3], with the following exceptions:

PHYSICAL CHANNEL RECONFIGURATION (STEP 2)

Information Element	Value/remark
RRC State Indicator	CELL PCH
UTRAN DRX cycle length coefficient	6
Downlink information for each radio link - Primary CPICH info - Primary scrambling code	Reference to TS 34.108 [3] clause 6.1 "Default settings (FDD)"

SYSTEM INFORMATION BLOCK TYPE1 (STEP 2)

Information Element	Value/remark
- UE timers and constants in connected mode	
- T302	1000 ms

SYSTEM INFORMATION BLOCK TYPE5 (STEP 2)

Information Element	Value/remark
- SIB6 indicator	TRUE
- PICH Power offset	-9 dB (in Test 1) -2 dB (in Test 2)
- CHOICE Mode	FDD
- AICH Power offset	0 dB
...	
- Secondary CCPCH system information	(For 2 SCCPCHs)
- Secondary CCPCH info	(SCCPCH for standalone PCH)
- CHOICE mode	FDD
- Secondary scrambling code	Not Present
- STTD indicator	FALSE
- Spreading factor	128
- Code number	3
- Pilot symbol existence	FALSE
- TFCI existence	FALSE
- Fixed or Flexible position	Fixed
- Timing offset	30
- TFCS	
- CHOICE TFCI signalling	Normal
- TFCI Field 1 information	
- CHOICE TFCS representation	Complete reconfiguration
- TFCS complete reconfiguration information	
- CHOICE CTFC Size	2 bit
- CTFC information	0
- Power offset information	Not Present
- CTFC information	1
- Power offset information	Not Present
- FACH/PCH information	
- TFS	(PCH)
- CHOICE Transport channel type	Common transport channels
- Dynamic Transport format information	
- RLC Size	240
- Number of TB and TTI List	
- Number of Transport blocks	0
- Number of Transport blocks	1
- CHOICE Mode	FDD
- CHOICE Logical channel List	ALL
- Semi-static Transport Format information	
- Transmission time interval	10 ms
- Type of channel coding	Convolutional
- Coding Rate	1/2
- Rate matching attribute	256
- CRC size	16 bit
- Transport channel Identity	12 (for PCH)
- CTCH indicator	FALSE
- PICH info	
- CHOICE mode	FDD
- Channelisation code	2
- Number of PI per frame	72
- STTD indicator	FALSE
- Secondary CCPCH info	(SCCPCH including two FACHs)
- CHOICE mode	FDD
- Secondary scrambling code	Not Present
- STTD indicator	FALSE
- Spreading factor	64
- Code number	2
- Pilot symbol existence	FALSE
- TFCI existence	TRUE (default value)
- Fixed or Flexible position	Flexible (default value)
- Timing offset	Not Present Absence of this IE is equivalent to default value 0

PAGING TYPE 1 (STEP 3)

Information Element	Value/remark
Message Type	
Paging record list	
-Paging record	
- CHOICE Used paging identity	Utran-Identity
-U-RNTI	
-SRNC-Identity	'000000000001'B
-S-RNTI	'00000000000000000001'B
BCCH modification info	Not Present

CELL UPDATE (STEP 4):

Information Element	Value/remark	Version
Cell update cause	paging response	

CELL UPDATE CONFIRM (STEP 4):

Information Element	Value/remark
RRC transaction identifier	0
Activation time	Not Present
RRC State indicator	CELL_PCH
UTRAN DRX cycle length coefficient	6

7.11.5 Test requirements

For the parameters specified in table 7.11.3 the average probability of missed paging (P_{m-p}) shall be below the specified value in table 7.11.4. Power of downlink channels other than S-CCPCH and PICH are as defined in Table E.3.3.1 of Annex E. S-CCPCH structure is as defined in Annex C.7.

Table 7.11.3: Parameters for PCH detection

Parameter	Unit	Test 1	Test 2
Number of paging indicators per frame (N_p)	-	72	
Phase reference	-	P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
\hat{I}_{or}/I_{oc}	dB	-0.6	-2.3
Propagation condition		Static	Case 3

Table 7.11.4: Test requirements for PCH detection

Test Number	S-CCPCH_Ec/Ior	PICH_Ec/Ior	Pm-p
1	-14.8	-19	0.01
2	-9.8	-12	0.01

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.

7.12 Detection of Acquisition Indicator (AI)

7.12.1 Definition and applicability

The receiver characteristics of Acquisition Indicator (AI) are determined by the probability of false alarm P_{fa} and probability of correct detection P_d . P_{fa} is defined as a conditional probability of detection of AI signature given that a AI signature was not transmitted. P_d is defined as a conditional probability of correct detection of AI signature given that the AI signature is transmitted.

The requirements and this test apply to all types of UTRA for the FDD UE for Release 4 and later releases.

7.12.2 Minimum requirements

For the parameters specified in table 7.12.1 the Pfa and 1-Pd shall not exceed the specified values in table 7.12.2. Power of downlink channels other than AICH is as defined in Table E.3.3.1 of Annex E.

Table 7.12.1: Parameters for AI detection

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Number of other transmitted AI signatures on AICH	-	0
\hat{I}_{or}/I_{oc}	dB	-1
AICH_Ec/Ior	dB	-22.0
AICH Power Offset	dB	-12.0
Propagation condition	-	Static

Note that AICH_Ec/Ior can not be set. Its value is calculated from other parameters and it is given for information only. (AICH_Ec/Ior = AICH Power Offset + CPICH_Ec/Ior)

Table 7.12.2: Test requirements for AI detection

Test Number	Pfa	1-Pd
1	0.01	0.01

The reference for this requirement is TS 25.101 [1] clause 8.13.1.

7.12.3 Test purpose

To verify that average probability of false detection of AI (Pfa) and average probability of missed AI (1-Pd) do not exceed specified values.

7.12.4 Method of test

7.12.4.1 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 to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26.
- 2) Set the test parameters for test 1 as specified in tables 7.12.4 and 7.12.5. Power of downlink channels other than AICH are as defined in Table E.3.3.1 of Annex E.

Table 7.12.3 UE parameters for AI test

Parameter	Unit	Set 1	Set 2
Maximum number of preamble ramping cycles (Mmax)		2	2
Maximum number of preambles in one preamble cycle (preamble retrans max)		32	12
Back-off time (Tb01=10ms*NB01) (NB01min=NB01max=10)	ms	100	100
Power ramp step when no acquisition indicator is received (power offset p0)	dB	1	3

Table 7.12.4 SS parameters for AI test

Parameter	Unit	Value
Primary CPICH DL TX power	dBm	-8
UL interference	dBm	-82
SIR in open loop power control (Constant value)	dB	-10

See reference TS25.331 [8] clause 8.5.7 Open loop power control to calculate $P_{initial}$. See also reference TS25.214 [5] subclause 6 step 6.3.

7.12.4.2 Procedure

- 1) The UE is switched on.
- 2) The SS and the UE shall perform location registration procedure as specified in TS34.108 [3] clause 7.2.2. UE parameters are set as defined in table 7.12.3 Set 1.
- 3) SS sends the Paging type 1 message in idle mode with used paging identity being a CN identity and including the UE's assigned IMSI.
- 4) UE starts transmitting RACH preambles at level $P=P_{initial}$.
- 5) SS does not send AI. If UE sends a new preamble a success for calculating P_{fa} is recorded. This step is repeated until UE stops sending preambles. SS does not calculate P_{fa} for the first preamble of every preamble cycles.
- 6) UE stops sending preambles. If number of sent preambles in the preamble cycle $< preamble_retrans_max$ a failure for calculating P_{fa} is recorded and test continues from step 3. If number of preamble cycles $M \neq M_{max}$, a new preamble cycle is initiated and test continues from step 4. If number of preamble cycles $M = M_{max}$ then test continues from step 3.
- 7) Repeat steps 5-6 according to Annex F.6.2 table 6.2.8.
- 8) UE parameters are set as defined in table 7.12.3 Set 2 by modification of system information block 5.
- 9) SS sends the Paging type 1 message in idle mode with used paging identity being a CN identity and including the UE's assigned IMSI.
- 10) UE starts transmitting RACH preambles.
- 11) SS responds with AI signature containing NACK in AICH.
- 12) If UE stops sending preambles, a success for calculating P_d is recorded. If UE does not stop sending preambles, a failure for calculating P_d is recorded.
- 13) Repeat steps 9-12 according to Annex F.6.2 table 6.2.8.

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] and clause 6.1.0b of 34.108 [3], with the following exceptions:

SYSTEM INFORMATION BLOCK TYPE 1

Information Element	Value/remark
- UE timers and constants in idle mode	
- T300	1000 ms

SYSTEM INFORMATION BLOCK TYPE 5

Information Element	Value/remark
AICH Power Offset	-12

7.12.5 Test requirements

For the parameters specified in table 7.12.5 the Pfa and 1-Pd shall not exceed the specified values in table 7.12.6. Power of downlink channels other than AICH are as defined in Table E.3.3.1 of Annex E.

Table 7.12.5: Parameters for AI detection

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Number of other transmitted AI signatures on AICH	-	0
\hat{I}_{or}/I_{oc}	dB	-0.6
AICH_Ec/Ior	dB	-22.0
AICH Power Offset	dB	-12.0
Propagation condition	-	Static

Table 7.12.6: Test requirements for AI detection

Test Number	Pfa	1-Pd
1	0.01	0.01

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.

7.12A Detection of E-DCH Acquisition Indicator (E-AI)

7.12A.1 Definition and applicability

The receiver characteristics of E-DCH Acquisition Indicator (E-AI) are determined by the probability of correct detection Pde. Pde is defined as a conditional probability of correct detection of E-AI signature given that the E-AI signature is transmitted and AI signature was correctly received.

The requirements and this test apply to all types of UTRA for the FDD UE for Release 8 and later releases supporting Enhanced Uplink in CELL_FACH state.

7.12A.2 Minimum requirements

For the parameters specified in Table 7.12A.1 the 1-Pde shall not exceed the specified value in Table 7.12A.2. The power settings for downlink channels other than AICH and E-AICH are set as defined in Table E.3.3.1 of Annex E.

Table 7.12A.1: Parameters for E-AI detection

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Number of other transmitted AI signatures on AICH	-	0
Number of resources assumed for E-DCH random access	-	32
\hat{I}_{or}/I_{oc}	dB	-1
AICH_Ec/Ior	dB	-22.0
AICH Power Offset	dB	-12.0
E-AICH_Ec/Ior	dB	-22.0
E-AICH Power Offset	dB	-12.0
Propagation condition	-	Static

Note that AICH_Ec/Ior and E-AICH_Ec/Ior can not be set; their values are calculated from other parameters and are given for information only.

Table 7.12A.2: Test requirements for E-AI detection

Test Number	1- Pde
1	0.005

The reference for this requirement is TS 25.101 [1] clause 8.13A.1.

7.12A.3 Test purpose

To verify that average probability of missed E-AI detection (1-Pde) does not exceed specified value.

7.12A.4 Method of test

7.12A.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 to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26.
- 2) Set the test parameters for test 1 as specified in tables 7.12A.4 and 7.12A.5. Power of downlink channels other than AICH are as defined in Table E.3.3.1 of Annex E.

Table 7.12A.3: UE parameters for E-AI test

Parameter	Unit	Set 1
Maximum number of preamble ramping cycles(Mmax)		2
Maximum number of preambles in one preamble cycle (preamble retrans max)		12
Back-off time (Tb01=10ms*NB01) (NB01min=NB01max=10)	ms	100
Power ramp step when no acquisition indicator is received (power offset p0)	dB	3

Table 7.12A.4: SS parameters for E-AI test

Parameter	Unit	Value
Primary CPICH DL TX power	dBm	-8
UL interference	dBm	-82
SIR in open loop power control (Constant value)	dB	-10

See reference TS25.331 [8] clause 8.5.7 Open loop power control to calculate Pinital. See also reference TS25.214 [5] subclause 6 step 6.3.

7.12A.4.2 Procedure

- 1) The UE is switched on.
- 2) The SS and the UE shall perform location registration procedure as specified in TS34.108 [3] clause 7.2.2. UE parameters are set as defined in table 7.12A.3 Set 1 by modification of system information block 5.
- 3) SS sends the Paging type 1 message in idle mode with used paging identity being a CN identity and including the UE's assigned IMSI.
- 4) UE starts transmitting RACH preambles at level P=Pinital.
- 5) SS responds with AI signature containing NACK in AICH and (-1) on E-AI corresponding to ACK on E-AICH. For E-AI SS can use any signature.

- 6) If UE stops sending preambles, and transmits a E-DCH on default resource block in CELL_FACH state then this is an indication that UE has falsely detected NACK on AI as ACK. However SS is not counting this as a false sample and tester goes back to step 3.
- 7) If UE sends another preamble then this is an indication that UE has falsely detected NACK on AI as No ACK/NACK. However SS is not counting this as a false sample and tester goes back to step 5.
- 8) If UE transmits a E-DCH on some other resource block than on a default value then this is an indication that UE has received correctly AI. Then tester checks whether the used E-DCH resource block corresponds to (-1) on transmitted E-AI signature or to some other combination of E-AI and signature using the E-AI resource configuration mapping table as specified in TS 25.211 [19] clause 5.3.3.7. If the used resource block corresponds (-1) on transmitted signature then a success for calculating Pde is recorded. Otherwise a failure for calculating Pde is recorded.
- 9) Repeat steps 3-8 according to Annex F.6.2 table 6.2.8.

Specific Message Contents

All messages indicated above shall use the same content as described in the default message content in clause 9 of TS 34.108 [3] and clause 6.1.0b of 34.108 [3], with the following exceptions:

SYSTEM INFORMATION BLOCK TYPE1

Information Element	Value/remark
- UE timers and constants in idle mode	
- T300	1000 ms

SYSTEM INFORMATION BLOCK TYPE5

Information Element	Value/remark
AICH Power Offset	-12

7.12A.5 Test requirements

For the parameters specified in Table 7.12A.5 the 1-Pde shall not exceed the specified value in Table 7.12A.6. The power settings for downlink channels other than AICH and E-AICH are set as defined in Table E.3.3.1 of Annex E.

Table 7.12A.5: Parameters for E-AI detection

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Number of other transmitted AI signatures on AICH	-	0
Number of resources assumed for E-DCH random access	-	32
\hat{I}_{or}/I_{oc}	dB	-0.6
AICH_Ec/Ior	dB	-22.0
AICH Power Offset	dB	-12.0
E-AICH_Ec/Ior	dB	-22.0
E-AICH Power Offset	dB	-12.0
Propagation condition	-	Static

Table 7.12A.6: Test requirements for E-AI detection

Test Number	1- Pde
1	0.005

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.

7.13 UE UL power control operation with discontinuous UL DPCCH transmission operation

7.13.1 Definition and applicability

This test verifies that the UE follows only those TPC commands that correspond to the UL DPCCH slots which are transmitted.

The requirements and this test apply to all types of UTRA for the FDD UE for Release 7 and later releases supporting Discontinuous UL DPCCH transmission.

Editor's note: This test case is not complete

7.13.2 Minimum requirement

Test parameters are specified in Table 7.13.1. The discontinuous UL DPCCH transmission is enabled during the test. The parameters for discontinuous UL DPCCH transmission operation are as specified in Table C.4.3.1. Before the start of the tests, the UE transmit power shall be initialised to -15 dBm. An actual UE transmit power may vary from the target level of -15 dBm due to inaccurate UE output power step.

After transmission gaps due to discontinuous uplink DPCCH transmission the uplink transmitter power difference shall be within the range as defined in Table 7.13.2. The transmit power difference is defined as the difference between the power of the last slot transmitted before the gap and the power of first slot transmitted after the gap. The on power observation period is defined as the mean power over one timeslot excluding any transient periods.

Table 7.13.1: Parameters for UE UL power control operation with discontinuous UL DPCCH transmission

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
HS-SCCH ₁ E_c/I_{or}	dB	-10
F-DPCH E_c/I_{or}	dB	-10
F-DPCH slot format	-	0
lor1	dBm/3.84 MHz	-60
Power-Control-Algorithm	-	Algorithm 1
UL Power Control step size, ΔTPC	dB	1
Uplink TPC commands corresponding to the UL DPCCH slots which are transmitted	-	{0,1,0,1,0,1 } Note 1
Propagation condition	-	Static without AWGN source I_{oc}
NOTE 1: The sequence of uplink TPC commands corresponds to the UL DPCCH slots that are transmitted. During those slots which correspond to UL DPCCH slots that are not transmitted, UP-commands shall be transmitted.		

Table 7.13.2: Minimum requirements for UE UL power control operation with discontinuous UL DPCCH transmission

Parameter	Unit	Test 1	
		Lower	Upper
UE output power difference tolerance	dB	-2	+4

The reference for this requirement is TS 25.101 [1] clause 8.14.1.

7.13.3 Test purpose

To verify that the UE follows only those TPC commands that correspond to the UL DPCCH slots which are transmitted.

7.13.4 Method of test

7.13.4.1 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 to the UE antenna connector as shown in figure A.9. In case of UE-receive diversity connect according to figure A.26.
2. Set up a HSDPA call according to the call setup procedure specified in TS 34.108 [3] clause 7.3.11 with levels according to Table E.5D.0.
3. Set the test parameters for the test as specified in tables 7.13.1. Power of downlink channels other than F-DPCH and HS-SCCH are as defined in Table E.5D.1.
4. Set the uplink DPCH power control parameters to use Algorithm 1 with a step size of 1 dB and the uplink HS-DPCCH to be discontinuous as specified in Table C.4.3.1.

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

7.13.4.2 Procedure

1. After call set up generate suitable TPC commands from the SS to set the output power of the UE, measured at the UE antenna connector, to be in the range $-15 \text{ dBm} \pm 2 \text{ dB}$. This is a nominal setting and not part of the test requirements.
2. SS shall not send any data on HS-DSCH.
3. SS then sends UP/DOWN/UP/DOWN TPC pattern as specified in Table 7.13.3 during those slots which correspond to UL DPCCH slots that are transmitted. During those slots which correspond to UL DPCCH slots that are not transmitted the SS shall send UP commands to the UE.

NOTE: Test requirements assume that SS sends UP command during the slot which corresponds to the first UL DPCCH slot which is transmitted after the gap. The SS implementation of this feature may require further studies.

4. The SS shall measure the uplink transmitter power difference. The transmit power difference is defined as the difference between the power of the last slot transmitted before the gap and the power of the first slot transmitted after the gap. The on power observation period is defined as the mean power over one timeslot excluding any transient periods.
5. The measured uplink transmitter power difference shall be within the range as defined in Table 7.13.4.

Specific Message Contents

All message indicated above shall use the same content as described in the default message content in clause 9 of TS 34.108 [3] with the following exceptions.

RRC CONNECTION REQUEST (Step 2)

Information Element	Value/remark	Version
Message Type		
Support for F-DPCH	TRUE	Rel-6

RADIO BEARER SETUP HSDPA with F-DPCH (Step 2)

Information Element	Value/remark	Version
UL Transport channel information for all transport channels <ul style="list-style-type: none"> - PRACH TFCS - CHOICE Mode - TFC subset - UL DCH TFCS - CHOICE TFCI signalling - TFCI Field 1 information - CHOICE TFCS representation - TFCS complete reconfiguration information - CHOICE CTFC Size - CTFC information - 2bit CTFC - Power offset Information - CHOICE Gain Factors - Reference TFC ID - CHOICE mode - Power offset Pp-m - 2bit CTFC - Power offset Information - CHOICE Gain Factors - CHOICE mode - Gain factor β_c - Gain factor β_d - Reference TFC ID - CHOICE mode - Power offset Pp-m 	Not Present FDD Not Present Normal Complete reconfiguration 2 bit CTFC 2 TFCS 0 computedGainFactors 0 FDD Not Present 1 signalledGainFactors FDD 11 15 0 FDD Not Present	
Uplink DPCH info <ul style="list-style-type: none"> - Uplink DPCH power control info - Δ_{ACK} - Δ_{NACK} - Ack-Nack repetition factor 	5 5 1 (ACKs/NACKs are not repeated)	Rel-6
Downlink HS-PDSCH Information <ul style="list-style-type: none"> - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Information - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - P_{Ohdsch} - CQI Feedback cycle, k - CQI repetition factor - Δ_{CQI} - CHOICE mode 	FDD Not present 2 FDD 7 dB 0 ms (CQI reports are not sent) 1 (CQI reports are not repeated) 5 (corresponds to 0dB in relative power offset) FDD (no data)	Rel-6
Downlink information common for all radio links		
- Downlink F-DPCH info common for all RL		Rel-6
- Timing Indication	Maintain	
- Timing maintained Synchronization indicator	FALSE	
- Downlink F-DPCH power control information		
- DPC mode	0 (single)	
- TPC command error rate target	0,01	
Downlink information for each radio link		
- Downlink information for each radio link		
- Choice mode	FDD	
- Primary CPICH info		
- Primary scrambling code	Reference to clause 6.1 "Default settings (FDD)"	
- Serving HS-DSCH radio link indicator	TRUE	Rel-5
- Downlink DPCH info for each RL	Not Present	
- Downlink F-DPCH info for each RL		Rel-6
- Primary CPICH usage for channel estimation	Primary CPICH may be used	

Information Element	Value/remark	Version
- F-DPCH frame offset	Set to value Default DPCH Offset Value (as currently stored in SS) mod 38 400	
- Secondary CPICH info	Not Present	
- Secondary scrambling code	Not Present	
- Code number	12	
- TPC combination index	0	

7.13.5. Test Requirements

Test parameters are specified in Table 7.13.3. After transmission gaps due to discontinuous uplink DPCCCH transmission the uplink transmitter power difference shall be within the range as defined in Table 7.13.4.

Table 7.13.3: Parameters for UE UL power control operation with discontinuous UL DPCCCH transmission

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
HS-SCCH_1 E_c/I_{or}	dB	-10
F-DPCH E_c/I_{or}	dB	-10
F-DPCH slot format	-	0
I_{or1}	dBm/3.84 MHz	-60
Power-Control-Algorithm	-	Algorithm 1
UL Power Control step size, Δ_{TPC}	dB	1
Uplink TPC commands corresponding to the UL DPCCCH slots which are transmitted	-	{0,1,0,1,0,1} Note 1
Propagation condition	-	Static without AWGN source I_{oc}
NOTE 1: The sequence of uplink TPC commands corresponds to the UL DPCCCH slots that are transmitted. During those slots which correspond to UL DPCCCH slots that are not transmitted, UP-commands shall be transmitted.		

Table 7.13.4: Test requirements for UE UL power control operation with discontinuous UL DPCCCH transmission

Parameter	Unit	Test 1	
		Lower	Upper
UE output power difference tolerance	dB	-[2.3]	+[4.3]

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.