# 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 as 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 (Ec/Ior) 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 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 | | | |  |
|  | -1 | | | | dB |
|  | -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 |  | 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 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 | | | |  |
|  | -0,7 | | | | dB |
|  | -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 |  | 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.

### 7.2.2 Demodulation of Dedicated Channel (DCH) when (DL\_DCH\_FET\_Config) is configured by higher layers

#### 7.2.2.1 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.

The requirements and this test apply to release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.2.2.2 Minimum requirements

For the parameters specified in table 7.2.2.1 the average downlink power ratio shall be below the specified value for the BLER shown in table 7.2.2.2. These requirements are applicable for TFCS size 16.

Table 7.2.2.1: DCH parameters in static propagation conditions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
| Phase reference |  | P-CPICH | | | |
|  | dB | -1 | | | |
|  | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 12.2 | 0 | 0 |
| DCCH Presence | - | Yes | No | Yes | No |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | | | |
| Note 1: UL is in 10ms transmission mode | | | | | |

Table 7.2.2.2: DCH requirements in static propagation conditions

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -17.6 dB | 10-2 |
| 2 | -15.5 dB | 10-2 |
| 3 | -19.3 dB | 10-2 |
| 4 | -17.2 dB | 10-2 |

The reference for this requirement is TS 25.101 [1] clause 8.2.4.

#### 7.2.2.3 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 with DL\_DCH\_FET\_Config by higher layers.

#### 7.2.2.4 Method of test

##### 7.2.2.4.1 Initial conditions

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

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

1. Connect the SS 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 with the following exception in the RADIO BEARER SETUP messages in table 7.2.2.3. This exception allows the call to be setup in DL\_DCH\_FET mode.

3. Set the test parameters for test 1-4 as specified in table 7.2.2.3.

4. 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.

Table 7.2.2.3: Contents of Radio bearer setup message

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

##### 7.2.2.4.2 Procedures

1. Measure BLER of DCH.

#### 7.2.2.5 Test requirements

For the parameters specified in table 7.2.2.4 the average downlink power ratio shall be below the specified value for the BLER shown in table 7.2.2.5. 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 7.2.2.4: DCH parameters in static propagation conditions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | Test 3 | Test 4 |
| Phase reference |  | P-CPICH | | | |
|  | dB | -0.7 | | | |
|  | dBm/3.84 MHz | -60 | | | |
| Information Data Rate | kbps | 12.2 | 12.2 | 0 | 0 |
| DCCH Presence | - | Yes | No | Yes | No |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | | | |
| Note 1: UL is in 10ms transmission mode | | | | | |

Table 7.2.2.5: DCH requirements in static propagation conditions

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -17.5 dB | 10-2 |
| 2 | -15.4 dB | 10-2 |
| 3 | -19.2 dB | 10-2 |
| 4 | -17.1dB | 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 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 | | | |  |
|  | 9 | | | | dB |
|  | -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 |  | 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 | | | |  |
|  | -3 | -3 | 3 | 6 | dB |
|  | -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 |  | 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 | | | |  |
|  | -3 | -3 | 3 | 6 | dB |
|  | -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 |  | 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 | | | |  |
|  | 9 | | | | dB |
|  | -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 |  | 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 | | | |  |
|  | -3 | -3 | 3 | 6 | dB |
|  | -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 |  | 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 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 | | | |  |
|  | 9,6 | | | | dB |
|  | -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 |  | 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 | | | |  |
|  | -2,4 | -2,4 | 3,6 | 6,6 | dB |
|  | -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 |  | 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 | | | |  |
|  | -2,4 | -2,4 | 3,6 | 6,6 | dB |
|  | -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 |  | 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 | | | |  |
|  | 9,6 | | | | dB |
|  | -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 |  | 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 | | | |  |
|  | -2,4 | -2,4 | 3,6 | 6,6 | dB |
|  | -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 |  | BLER |
| 17 | -8,7 dB | 10-2 |
| 18 | -5,0 dB | 10-1 |
| -4,3 dB | 10-2 |
| -3,7 dB | 10-3 |
| 19 | -5,9 dB | 10-1 |
| -5,4 dB | 10-2 |
| -4,9 dB | 10-3 |
| 20 | -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.

### 7.3.2 Single Link Performance when (DL\_DCH\_FET\_Config) is configured by higher layers

#### 7.3.2.1 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.

The requirements and this test apply to release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.3.2.2 Minimum requirements

For the parameters specified in tables 7.3.2.1, 7.3.2.3, 7.3.2.5, 7.3.2.7 and 7.3.2.9 the average downlink power ratio shall be below the specified value for the BLER shown in tables 7.3.2.2, 7.3.2.4, 7.3.2.6, 7.3.2.8 and 7.3.2.10.

Table 7.3.2.1: DCH parameters in multi-path fading propagation conditions (Case 1)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 |
| Phase reference |  | P-CPICH |  |
|  | dB | 9 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | |
| Note 1: UL is in 10ms transmission mode | | | |

Table 7.3.2.2: DCH requirements in multi-path fading propagation conditions (Case 1)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -13.4 dB | 10-2 |
| 2 | -16.6 dB | 10-2 |

Table 7.3.2.3: DCH parameters in multi-path fading propagation conditions (Case 2)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 3 | Test 4 |
| Phase reference |  | P-CPICH |  |
|  | dB | -3 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.4: DCH requirements in multi-path fading propagation conditions (Case 2)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 3 | -5.5 dB | 10-2 |
| 4 | -8.9 dB | 10- 2 |

Table 7.3.2.5: DCH parameters in multi-path fading propagation conditions (Case 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 5 | Test 6 |
| Phase reference |  | P-CPICH |  |
|  | dB | -3 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.6: DCH requirements in multi-path fading propagation conditions (Case 3)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 5 | -10.0 dB | 10-2 |
| 6 | -12.5 dB | 10-2 |

Table 7.3.2.7: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 7 | Test 8 |
| Phase reference |  | S-CPICH |  |
|  | dB | 9 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.8: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 7 | -13.4 dB | 10-2 |
| 8 | -16.6 dB | 10-2 |

Table 7.3.2.9: DCH parameters in multi-path fading propagation conditions (Case 6)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 9 | Test 10 |
| Phase reference |  | P-CPICH |  |
|  | dB | -3 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | Kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.10: DCH requirements in multi-path fading propagation conditions (Case 6)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 9 | -9.9 dB | 10-2 |
| 10 | -12.2 dB | 10-2 |

The reference for this requirement is TS 25.101 [1] clause 8.3.2.1.

#### 7.3.2.3 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 with DL\_DCH\_FET\_Config by higher layers.

#### 7.3.2.4 Method of test

##### 7.3.2.4.1 Initial conditions

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

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

1. Connect the SS, 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 with the following exception in the RADIO BEARER SETUP messages in table 7.3.2.11. This exception allows the call to be setup in DL\_DCH\_FET mode.

3. Set the test parameters for test 1-10 as specified table 7.3.2.11, table 7.3.2.13, table 7.3.2.15, table 7.3.2.17 and table 7.3.2.19.

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.

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

Table 7.3.2.11: Contents of Radio bearer setup message

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

7.3.2.4.2 Procedures

1. Measure BLER of DCH.

#### 7.3.2.5 Test requirements

For the parameters specified in tables 7.3.2.12, 7.3.2.14, 7.3.2.16, 7.3.2.18 and 7.3.2.20 the average downlink power ratio shall be below the specified value for the BLER shown in tables 7.3.2.11, 7.3.2.15, 7.3.2.17, 7.3.2.19 and 7.3.2.21.

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

Table 7.3.2.12: DCH parameters in multi-path fading propagation conditions (Case 1)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 |
| Phase reference |  | P-CPICH |  |
|  | dB | 9.6 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | |
| Note 1: UL is in 10ms transmission mode | | | |

Table 7.3.2.13: DCH requirements in multi-path fading propagation conditions (Case 1)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -13.3 dB | 10-2 |
| 2 | -16.5 dB | 10-2 |

Table 7.3.2.14: DCH parameters in multi-path fading propagation conditions (Case 2)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 3 | Test 4 |
| Phase reference |  | P-CPICH |  |
|  | dB | -2.4 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.15: DCH requirements in multi-path fading propagation conditions (Case 2)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 3 | -5.4 dB | 10-2 |
| 4 | -8.8 dB | 10- 2 |

Table 7.3.2.16: DCH parameters in multi-path fading propagation conditions (Case 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 5 | Test 6 |
| Phase reference |  | P-CPICH |  |
|  | dB | -2.4 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.17: DCH requirements in multi-path fading propagation conditions (Case 3)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 5 | -9.9 dB | 10-2 |
| 6 | -12.4 dB | 10-2 |

Table 7.3.2.18: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 7 | Test 8 |
| Phase reference |  | S-CPICH |  |
|  | dB | 9.6 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.19: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 7 | -13.3 dB | 10-2 |
| 8 | -16.5 dB | 10-2 |

Table 7.3.2.20: DCH parameters in multi-path fading propagation conditions (Case 6)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 9 | Test 10 |
| Phase reference |  | P-CPICH |  |
|  | dB | -2.4 |  |
|  | dBm/3.84 MHz | -60 |  |
| Information Data Rate | Kbps | 12.2 | 0 |
| DCCH Presence | - | No | |

Table 7.3.2.21: DCH requirements in multi-path fading propagation conditions (Case 6)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 9 | -9.8 dB | 10-2 |
| 10 | -12.1 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.

## 7.4 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 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.

#### 7.4.1.2 Minimum requirements

For the parameters specified in table 7.4.1.1 the average downlink 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 | |  |
|  | -1 | | dB |
|  | -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 |  | 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 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 | |  |
|  | -0,4 | | dB |
|  | -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 |  | 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 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 | |  |
|  | -1 | | dB |
|  | -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 |  | 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 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 | |  |
|  | -0,4 | | dB |
|  | -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 |  | 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  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 |
|  | dB | 5 |
|  | 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 |  | 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 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 |
|  | dB | 5.6 |
|  | 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 |  | 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 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 |  |
|  | 9 | dB |
|  | -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 | (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 | TRUE |
| - Secondary CCPCH info |  |
| - STTD Indicator | TRUE |
| Primary CCPCH info |  |
| - CHOICE mode | FDD |
| - TX Diversity indicator | 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 | FDD |
| - TX Diversity Mode | STTD, |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 1 |

RADIO BEARER SETUP

|  |  |
| --- | --- |
| Information Element | Value/remark |
| Downlink information common for all radio links |  |
| - Choice mode | FDD |
| - TX Diversity Mode | STTD |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 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 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 |  |
|  | 9,8 | dB |
|  | -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 | (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 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 |
|  | 9 | 9 | dB |
|  | -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 | (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 | TRUE |
| - Secondary CCPCH info |  |
| - STTD Indicator | TRUE |
| Primary CCPCH info |  |
| - CHOICE mode | FDD |
| - TX Diversity indicator | 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 | FDD |
| - TX Diversity Mode | Closed loop mode1 |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 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 | FDD |
| - TX Diversity Mode | Closed loop mode2 |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 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 | FDD |
| - TX Diversity Mode | Closed loop mode1 |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 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 | FDD |
| - TX Diversity Mode | Closed loop mode2 |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - Closed loop timing adjustment mode | 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 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 |
|  | 9,8 | 9,8 | dB |
|  | -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 | (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 Ior are the same as those specified in clause E.3.3 irrespective of Node Bs and the test cases. DPCH\_Ec/Ior 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 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 | | | |  |
|  | 0 | -3 | 0 | 0 | dB |
|  | 0 | 0 | 0 | -3 | dB |
|  | -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 |  | 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 | FDD |
| - SSDT information |  |
| - S field | 1 |
| - Code Word Set | long |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - SSDT Cell Identity | a |

RRC CONNECTION SETUP for Test 3 and Test 4

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

RADIO BEARER SETUP for Test 1 and Test 2

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

RADIO BEARER SETUP for Test 3 and Test 4

|  |  |
| --- | --- |
| Information Element | Value/remark |
| Downlink information common for all radio links |  |
| - CHOICE mode | FDD |
| - SSDT information |  |
| - S field | 2 |
| - Code Word Set | short |
| Downlink DPCH info for each RL |  |
| - CHOICE mode | FDD |
| - Downlink DPCH info for each RL |  |
| - SSDT Cell Identity | 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 | 0 |  |
| - Integrity check info  -message authentication code  -RRC message sequence number | 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. |  |
| **-** Activation time | "now". |  |
| - New U-RNTI | Not Present |  |
| CN information elements |  |  |
| - CN Information info | Not Present |  |
| Phy CH information elements |  |  |
| Uplink radio resources |  |  |
| - Maximum allowed UL TX power | 33 dBm |  |
| Downlink radio resources |  |  |
| - Radio link addition information | 1 |  |
| - Radio link addition information |  |  |
| - Primary CPICH info | Same as defined in Cell2 |  |
| - Downlink DPCH info for each RL |  |  |
| - CHOICE mode | FDD |  |
| - Primary CPICH usage for channel estimation | Primary CPICH may be used |  |
| - DPCH frame offset | This should be reflected by the IE" Cell synchronisation information" in received MEASUREMENT REPORT message |  |
| - Secondary CPICH info | Not Present |  |
| - DL channelisation code |  |  |
| - Secondary scrambling code | Not Present |  |
| - Spreading factor | 128 |  |
| - Code number | 96 |  |
| - Scrambling code change | No code change |  |
| - TPC combination index | 0 |  |
| - SSDT Cell Identity | b |  |
| - Closed loop timing adjustment mode | Not Present |  |
| - TFCI combining indicator | FALSE | R99 and Rel-4 only |
| - SCCPCH Information for FACH | Not Present |  |
| - Radio link removal information | Not Present |  |
| - TX Diversity Mode | None |  |
| - SSDT information |  |  |
| - S field | 1 |  |
| - Code Word Set | 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 | 0 |  |
| - Integrity check info  - message authentication code  - RRC message sequence number | 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. |  |
| **-** Activation time | "now". |  |
| - New U-RNTI | Not Present |  |
| CN information elements |  |  |
| - CN Information info | Not Present |  |
| Phy CH information elements |  |  |
| Uplink radio resources |  |  |
| - Maximum allowed UL TX power | 33 dBm |  |
| Downlink radio resources |  |  |
| - Radio link addition information | 1 |  |
| - Radio link addition information |  |  |
| - Primary CPICH info | Same as defined in Cell2 |  |
| - Downlink DPCH info for each RL |  |  |
| - CHOICE mode | FDD |  |
| - Primary CPICH usage for channel estimation | Primary CPICH may be used |  |
| - DPCH frame offset | This should be reflected by the IE" Cell synchronisation information" in received MEASUREMENT REPORT message |  |
| - Secondary CPICH info | Not Present |  |
| - DL channelisation code |  |  |
| - Secondary scrambling code | Not Present |  |
| - Spreading factor | 128 |  |
| - Code number | 96 |  |
| - Scrambling code change | No code change |  |
| - TPC combination index | 0 |  |
| - SSDT Cell Identity | b |  |
| - Closed loop timing adjustment mode | Not Present |  |
| - TFCI combining indicator | FALSE | R99 and Rel-4 only |
| - SCCPCH Information for FACH | Not Present |  |
| - Radio link removal information | Not Present |  |
| - TX Diversity Mode | None |  |
| - SSDT information |  |  |
| - S field | 2 |  |
| - Code Word Set | 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 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 | | | |  |
|  | 0,8 | -2,2 | 0,8 | 0,8 | dB |
|  | 0,8 | 0,8 | 0,8 | -2,2 | dB |
|  | -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 |  | 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 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 | | | |  |
| and | 0 | 0 | 3 | 6 | dB |
|  | -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 |  | 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\_Ec/Ior 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 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 | | | |  |
| and | 0,6 | 0,6 | 3,6 | 6,6 | dB |
|  | -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 |  | 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 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 | | | |  |
| and | 0 | 0 | 3 | 6 | dB |
|  | -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 |  | 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/Ior 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 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 | | | |  |
| and | 0,6 | 0,6 | 3,6 | 6,6 | dB |
|  | -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 |  | 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.

### 7.7.1B Demodulation of DCH in Inter-Cell Soft Handover when (DL\_DCH\_FET\_Config) is configured by higher layers

#### 7.7.1B.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.

The requirements and this test apply to release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.7.1B.2 Minimum requirements

For the parameters specified in table 7.7.1B.1 the average downlink power ratio shall be below the specified value for the BLER shown in table 7.7.1B.2.

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

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
| Phase reference |  | P-CPICH |
| and | dB | 0 |
|  | dBm/3.84 MHz | -60 |
| Information Data Rate | kbps | 12.2 |
| DCCH Presence | - | No |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) |
| Note 1: UL is in 10ms transmission mode | | |

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

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -14.6 dB | 10-2 |

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

#### 7.7.1B.3 Test purpose

To verify that the BLER does not exceed the value at the DPCH\_Ec/Ior specified in table 7.7.1B.2 with DL\_DCH\_FET\_Config by higher layers.

#### 7.7.1B.4 Method of test

##### 7.7.1B.4.1 Initial conditions

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

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

##### 7.7.1B.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 with the following exception in the RADIO BEARER SETUP messages in table 7.7.1B.3. This exception allows the call to be setup in DL\_DCH\_FET mode.

3) Set the test parameters for test 1 as specified in table 7.7.1B.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

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

Table 7.7.1B.3: Contents of Radio bearer setup message

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.7.1B.5 Test requirements

For the parameters specified in table 7.7.1B.4 the average downlink power ratio shall be below the specified value for the BLER shown in table 7.7.1B.5.

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

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
| Phase reference |  | P-CPICH |
| and | dB | 0.6 |
|  | dBm/3.84 MHz | -60 |
| Information Data Rate | kbps | 12.2 |
| DCCH Presence | - | No |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) |
| Note 1: UL is in 10ms transmission mode | | |

Table 7.7.1B.5: DCH requirements in multi-path propagation conditions during Soft Handoff (Case 3)

|  |  |  |
| --- | --- | --- |
| Test Number |  | BLER |
| 1 | -14.5 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 Ioc.

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/Ior | -12 | | dB |
| and | -60 | | dBm / 3,84 MHz |
|  | - | -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 | 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 | ³0,25 | ³0,5 |

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 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 DPCH 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 (Îor) 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 ms 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.

7) Initialise variables "Transmitted power UP" and "Transmitted power DOWN" to zero.

8) Set the test parameters as specified in table 7.7.2.4 for Test 2.

9) Set up a call according to the Generic Call Setup procedure.

10) Signal the uplink DPCH power control parameters to use Algorithm 1 and a step size of 1 dB.

11) Enter the UE into loopback test mode and start the loopback test.

12) Perform the following steps a) to d) 193 times:

a) Before proceeding with step b), set the output power of the UE to be in the range -10 ± 9 dBm. This may be achieved by generating suitable downlink TPC commands from the SSs.

b) Send the following sequences of TPC commands in the downlink from each SS over a period of 33 timeslots:

|  |  |
| --- | --- |
|  | Downlink TPC commands |
| SS1 | 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 |
| SS2 | 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 |

c) Measure the mean output power of the UE in each timeslot, not including the 25 ms transient periods at the start and end of each slot.

d) For each timeslot from the 2nd timeslot to the 33rd timeslot inclusive:

- if the mean power in that timeslot is greater than or equal to the mean power in the previous timeslot plus 0.4 dB, increment "Transmitted power UP" by 1;

- if the mean power in that timeslot is less than or equal to the mean power in the previous timeslot minus 0.4 dB, increment "Transmitted power DOWN" by 1.

#### 7.7.2.5 Test requirements

Test parameters are specified in table 7.7.2.4. The delay profiles of the signals received from the different cells are the same but time-shifted by 10 chips.

Table 7.7.2.4: Parameters for TPC command combining

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Test 1 | Test 2 | Unit |
| Phase reference | P-CPICH | | - |
| DPCH\_Ec/Ior | -11,9 | | dB |
| and | -60 | -59.4 | dBm / 3,84 MHz |
|  | - | -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 | Multi-path fading case 3 | - |

1) In Step 3) of clause 7.7.2.4.2, the mean power in slot #1 shall be less than or equal to the mean power in slot #0 minus 0.4 dB.

2) In Step 3) of clause 7.7.2.4.2, the mean power in slot #2 shall be less than or equal to the mean power in slot #1 minus 0.4 dB.

3) In Step 3) of clause 7.7.2.4.2, the mean power in slot #3 shall be less than or equal to the mean power in slot #2 minus 0.4 dB.

4) In Step 3) of clause 7.7.2.4.2, the mean power in slot #4 shall be greater than or equal to the mean power in slot #3 plus 0.4 dB.

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.

### 7.7.2A Combining of TPC commands from radio links of different radio link sets when (DL\_DCH\_FET\_Config) is configured by higher layers

#### 7.7.2A.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 release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.7.7.2A.2 Minimum requirements

Test parameters are specified in table 7.7.2A.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 7.7.2A.2 over the 4 consecutive slots more than 99% of the time. Note that this case is without an additional noise source Ioc.

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 7.7.2A.3.

Table 7.7.2A.1: Parameters for TPC command combining

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 |
| Phase reference | - |  | |
| DPCH\_Ec/Ior | dB | -12 | |
| and | dBm/3.84 MHz | -60 | |
|  | dBm/3.84 MHz | - | -60 |
| 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 | kbps | 12.2 | |
| DCCH Presence | - | No | |
| Propagation condition | - | Static without AWGN source | Multi-path fading case 3 |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | |
| Note 1: UL is in 20ms transmission mode | | | |

Table 7.7.2A.2: Requirements for Test 1

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

Table 7.7.2A.3: Requirements for Test 2

|  |  |  |
| --- | --- | --- |
| Test Number | Ratio  (Transmitted power UP) / (Total number of slots) | Ratio  (Transmitted power DOWN) / (Total number of slots) |
| 2 | ³0,25 | ³0,5 |

The reference for this requirement is TS 25.101 [1] clause 8.7.2A.1.

#### 7.7.2A.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 7.7.2A.2 and 7.7.2A.3 with DL\_DCH\_FET\_Config by higher layers.

#### 7.7.2A.4 Method of test

##### 7.7.2A.4.1 Initial conditions

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

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

1) Connect 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 test 1 the AWGN generators in figure A.13 and A.27 are switched off.

2) Set the test parameters as specified in table 7.7.2A.4 for Test 1.

3) Set up a call according to the Generic Call Setup procedure TS34.108 [3] sub clause 7.3.2 with the following exception in the RADIO BEARER SETUP messages in table 7.2.2A.4. This exception allows the call to be setup in DL\_DCH\_FET mode.

4) Signal the uplink DPCH 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.

Table 7.2.2A.4: Contents of Radio bearer setup message

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

##### 7.7.2A.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 (Îor) 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 ms transient periods at the start and end of each slot.

4) Repeat steps 1) to 3) according to Annex F.6.2Table 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.

7) Initialise variables "Transmitted power UP" and "Transmitted power DOWN" to zero.

8) Set the test parameters as specified in table 7.7.2A.4 for Test 2.

9) Set up a call according to the Generic Call Setup procedure.

10) Signal the uplink DPCH power control parameters to use Algorithm 1 and a step size of 1 dB.

11) Enter the UE into loopback test mode and start the loopback test.

12) Perform the following steps a) to d) 193 times:

a) Before proceeding with step b), set the output power of the UE to be in the range -10 ± 9 dBm. This may be achieved by generating suitable downlink TPC commands from the SSs.

b) Send the following sequences of TPC commands in the downlink from each SS over a period of 33 timeslots:

|  |  |
| --- | --- |
|  | Downlink TPC commands |
| SS1 | 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 |
| SS2 | 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 |

c) Measure the mean output power of the UE in each timeslot, not including the 25 ms transient periods at the start and end of each slot.

d) For each timeslot from the 2nd timeslot to the 33rd timeslot inclusive:

- if the mean power in that timeslot is greater than or equal to the mean power in the previous timeslot plus 0.4 dB, increment "Transmitted power UP" by 1;

- if the mean power in that timeslot is less than or equal to the mean power in the previous timeslot minus 0.4 dB, increment "Transmitted power DOWN" by 1.

#### 7.7.2A.5 Test requirements

Test parameters are specified in table 7.7.2A.5. The delay profiles of the signals received from the different cells are the same but time-shifted by 10 chips.

Table 7.7.2A.5: Parameters for TPC command combining

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | |
| Phase reference | - |  | | |
| DPCH\_Ec/Ior | dB | -11.9 | | |
| and | dBm/3.84 MHz | -60 | | -59.4 |
|  | dBm/3.84 MHz | - | -60 | |
| 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 | kbps | 12.2 | | |
| DCCH Presence | - | No | | |
| Propagation condition | - | Static without AWGN source | Multi-path fading case 3 | |
| DL\_DCH\_FET\_Config | - | 0 (Note 1) | | |
| Note 1: UL is in 20ms transmission mode | | | | |

1) In Step 3) of clause 7.7.2A.4.2, the mean power in slot #1 shall be less than or equal to the mean power in slot #0 minus 0.4 dB.

2) In Step 3) of clause 7.7.2A.4.2, the mean power in slot #2 shall be less than or equal to the mean power in slot #1 minus 0.4 dB.

3) In Step 3) of clause 7.7.2A.4.2, the mean power in slot #3 shall be less than or equal to the mean power in slot #2 minus 0.4 dB.

4) In Step 3) of clause 7.7.2A.4.2, the mean power in slot #4 shall be greater than or equal to the mean power in slot #3 plus 0.4 dB.

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.6.1.6.2for 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/Ior1 | dB | Note 1 | Note 1 & Note 3 |
| DPCH\_Ec/Ior2 | dB | DPCH\_Ec/Ior1 - 10 | DPCH\_Ec/Ior1 + 6 |
| DPCH\_Ec/Ior3 | dB | DPCH\_Ec/Ior1 - 10 | - |
| Îor1/Ioc | dB | -1 | -1 |
| Îor2/Ioc | dB | -1 | -1 |
| Îor3/Ioc | dB | -1 | - |
|  | 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/Ior1 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/Ior1 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 Ec/Ior1 level is adjusted so that 5 +/-1%. downlink TPC error is maintained from Ec/Ior1. 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 Ec/Ior1 is adjusted so that the TPC error rate is equal to 5 +/-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 Ec/Ior2 and DPCH Ec/Ior3 are adjusted to be 10 dB lower than DPCH\_Ec/Ior1.

8) Measure the mean output power of the UE, not including the 25 ms 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 Ec/Ior1 level is adjusted so that 5 +/-1%. downlink TPC error is maintained from Ec/Ior1. 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 Ec/Ior1 is adjusted so that the TPC error rate is equal to 5 +/-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 Ec/Ior2 is adjusted to be 6 dB higher than DPCH\_Ec/Ior1.

8) Measure the mean output power of the UE, not including the 25 ms 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\_Ec/Ior1 | dB | Note 1 | Note 1 & Note 3 |
| DPCH\_Ec/Ior2 | dB | DPCH\_Ec/Ior1 - 10 | DPCH\_Ec/Ior1 + 6 |
| DPCH\_Ec/Ior3 | dB | DPCH\_Ec/Ior1 - 10 | - |
| Îor1/Ioc | dB | -1 | -1 |
| Îor2/Ioc | dB | -1 | -1 |
| Îor3/Ioc | dB | -1 | - |
|  | 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/Ior1 is configured to a level such that the TPC error rate is set to 5+/-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\_Ec/Ior1 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.

### 7.7.3A Combining of reliable TPC commands from radio links of different radio link sets when DL\_DCH\_FET\_Config [10] is configured by higher layers

#### 7.7.3A.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 release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.7.3A.2 Minimum requirements

Test parameters are specified in Table 7.7.3A.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 7.7.3A.2.

Table 7.7.3A.1: Parameters for reliable TPC command combining

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 |
| Phase reference | - | P-CPICH | |
| DPCH\_Ec/Ior1 | dB | Note 1 | Note 1 & Note 3 |
| DPCH\_Ec/Ior2 | dB | DPCH\_Ec/Ior1 - 10 | DPCH\_Ec/Ior1 + 6 |
| DPCH\_Ec/Ior3 | dB | DPCH\_Ec/Ior1 - 10 | - |
| Îor1/Ioc | dB | -1 | -1 |
| Îor2/Ioc | dB | -1 | -1 |
| Îor3/Ioc | dB | -1 | - |
|  | 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/Ior1 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/Ior1 level in cell1 is -9 dB. | | | |

Table 7.7.3A.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 8.7.4.1.

#### 7.7.3A.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 7.7.3A.2 and 7.7.3A.3 with DL\_DCH\_FET\_Config by higher layers.

#### 7.7.3A.4 Method of test

##### 7.7.3A.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.

##### 7.7.3A.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 with the following exception in the RADIO BEARER SETUP messages in table 7.2.3A.2.1. This exception allows the call to be setup in DL\_DCH\_FET mode. 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 7.7.3A.3 for Test 1.

4) The downlink DPCH Ec/Ior1 level is adjusted so that 5 +/-1%. downlink TPC error is maintained from Ec/Ior1. 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 Ec/Ior1 is adjusted so that the TPC error rate is equal to 5 +/-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 Ec/Ior2 and DPCH Ec/Ior3 are adjusted to be 10 dB lower than DPCH\_Ec/Ior1.

8) Measure the mean output power of the UE, not including the 25 ms 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.

##### 7.7.3A.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.

##### 7.7.3A.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 with the following exception in the RADIO BEARER SETUP messages in table 7.2.3A.2.1. This exception allows the call to be setup in DL\_DCH\_FET mode. 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 7.7.3A.3 for Test 2.

4) The downlink DPCH Ec/Ior1 level is adjusted so that 5 +/-1%. downlink TPC error is maintained from Ec/Ior1. 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 Ec/Ior1 is adjusted so that the TPC error rate is equal to 5 +/-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 Ec/Ior2 is adjusted to be 6 dB higher than DPCH\_Ec/Ior1.

8) Measure the mean output power of the UE, not including the 25 ms 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.

Table 7.2.3A.2.1: Contents of Radio bearer setup message

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.7.3A.5 Test requirements

Test parameters are specified in Table 7.7.3A.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 7.7.3A.3: Parameters for reliable TPC command combining

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 |
| Phase reference | - | P-CPICH | |
| DPCH\_Ec/Ior1 | dB | Note 1 | Note 1 & Note 3 |
| DPCH\_Ec/Ior2 | dB | DPCH\_Ec/Ior1 - 10 | DPCH\_Ec/Ior1 + 6 |
| DPCH\_Ec/Ior3 | dB | DPCH\_Ec/Ior1 - 10 | - |
| Îor1/Ioc | dB | -1 | -1 |
| Îor2/Ioc | dB | -1 | -1 |
| Îor3/Ioc | dB | -1 | - |
|  | 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/Ior1 is configured to a level such that the TPC error rate is set to 5+/-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\_Ec/Ior1 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 7.7.3A.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 7.7.3A.2.

2) In step 8) of clause 7.7.3A.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 7.7.3A.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 DPCCH 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 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 |
|  | 9 | -1 | dB |
|  | -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, 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 |
|  | -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 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 |
|  | 9,6 | -0,4 | dB |
|  | -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, 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 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 |
|  | -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 |
|  | -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 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 |
|  | 9 | -1 | 4 | 9 | dB |
|  | -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, 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 |
|  | -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 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 |
|  | 9.6 | -0.4 | 4.6 | 9.6 | dB |
|  | -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, 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 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 |
|  | -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.

### 7.8.1B Power control in the downlink, constant BLER target when DL\_DCH\_FET\_Config is configured by higher layers

#### 7.8.1B.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 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.8.1B.2 Minimum requirements

For the parameters specified in Table 7.8.1B.1 and Table 7.8.1B.2, the downlink  power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 7.8.1B.3, Table 7.8.1B.4, Table 7.8.1B.5 and Table 7.8.1B.6 more than 90% of the time. BLER shall be as shown in Table 7.8.1B.3, Table 7.8.1B.4, Table 7.8.1B.5 and Table 7.8.1B.6. Test requirements in Table 7.8.1B.3, Table 7.8.1B.4, Table 7.8.1B.5 and Table 7.8.1B.6 correspond to DL\_DCH\_FET\_Config is set to 0 with UL in 20ms transmission mode, DL\_DCH\_FET\_Config is set to 0 with UL in 10ms transmission mode, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and non-Null transmission in the UL, and, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and Null transmission in the UL respectively.

Table 7.8.1B.1: Test parameter for downlink power control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | |
|  | dB | 9 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| Reference channel in Annex A |  | A.3A.2 | A.3A.0 | |
| Target quality value on DTCH | BLER | 0.01 | | |
| Target quality value on DCCH | BLER | - | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power \* | dB | 7 | | |
| Minimum\_DL\_Power \* | dB | -18 | | -21 |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |

Table 7.8.1B.2: Test parameter for downlink power control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test 3 | Test 4 | |
|  | dB | -1 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| Reference channel in Annex A |  | A.3A.2 | A.3A.0 | |
| Target quality value on DTCH | BLER | 0.01 | | |
| Target quality value on DCCH | BLER | - | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power \* | dB | 7 | | |
| Minimum\_DL\_Power \* | dB | -18 | | -21 |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |

NOTE: Power is compared to P-CPICH as specified in TS 25.101 [1].

Table 7.8.1B.3: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.7 | -19.8 | -10.2 | -11.7 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.4: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -14.4 | -16.5 | -6.0 | -8.7 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.5: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.5 | -19.8 | -9.6 | -11.6 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.6: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.5 | -19.7 | -9.6 | -11.6 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

The reference for this requirement is TS 25.101 [1] clause 8.8.1A.1.

#### 7.8.1B.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.

#### 7.8.1B.4 Method of test

7.8.1B.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN source to the UE antenna connector as shown in figure A.10. 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 following exception in the RADIO BEARER SETUP messages in table 7.8.1B.6.1, 7.8.1B.6.2 and 7.8.1B.6.3. These exceptions allows the call to be setup in different DL\_DCH\_FET modes as per test requirements.

3) RF parameters are set up according to table 7.8.1B.7 & 7.8.1B.8.

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.

7.8.1B.4.2 Procedure

1) After call set up, the SS waits 15 seconds.

2) After this period, BLER is measured. Simultaneously the downlink power ratio averaged over one slot is measured.

Table 7.8.1B.6.1: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  | Not Present |  |
| 20 ms only |  |  |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.1B.6.2: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.1B.6.3: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | Not Present |  |
| Full |  | NULL |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.8.1B.5 Test Requirements

The test parameters are specified in table 7.8.1B.7 & 7.8.1B.8.

Table 7.8.1B.7: Test parameter for downlink power control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | |
|  | dB | 9.6 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| Reference channel in Annex A |  | A.3A.2 | A.3A.0 | |
| Target quality value on DTCH | BLER | 0.01 | | |
| Target quality value on DCCH | BLER | - | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power \* | dB | 7 | | |
| Minimum\_DL\_Power \* | dB | -18 | | -21 |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |

Table 7.8.1B.8: Test parameter for downlink power control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test 3 | Test 4 | |
|  | dB | -0.4 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| Reference channel in Annex A |  | A.3A.2 | A.3A.0 | |
| Target quality value on DTCH | BLER | 0.01 | | |
| Target quality value on DCCH | BLER | - | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power \* | dB | 7 | | |
| Minimum\_DL\_Power \* | dB | -18 | | -21 |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |

a) The measured quality on DTCH does not exceed the values in table 7.8.1B.9, 7.8.1B.10, 7.8.1B.11, 7.8.1B.12. BLER measurements shall be performed according to the statistical testing in Annex F.6.1.10.

b) The downlink power ratio values, which are averaged over one slot, shall be below the values in table 7.8.1B.9, 7.8.1B.10, 7.8.1B.11, 7.8.1B.12 more than 90 % of the time.

Table 7.8.1B.9: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.6 | -19.7 | -10.1 | -11.6 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.10: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -14.3 | -16.4 | -5.9 | -8.6 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.11: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.4 | -19.7 | -9.5 | -11.5 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 0.01±30% | 0.01±30% |

Table 7.8.1B.12: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | **Test 2** | **Test 3** | **Test 4** |
|  | dB | -17.4 | -19.6 | -9.5 | -11.5 |
| Measured quality on DTCH | BLER | 0.01±30% | 0.01±30% | 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.

### 7.8.2 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 |
|  | -1 | | | | dB |
|  | -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, 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 |
| during T1 | -18,9 £ DPCH\_Ec/Ior £ -11,9 | -15,1 £ DPCH\_Ec/Ior £ -8,1 | dB |
| during T2 | -18,9 £ DPCH\_Ec/Ior £ -14,9 | -15,1 £ DPCH\_Ec/Ior £ -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/Ior 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 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 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/Ior | -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 |
|  | -1 | | | | dB |
|  | -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, TPC | 1 | | | | dB |
| Limited Power Increase | "Not used" | | | |  |
| NOTE 1: Power is compared to P-CPICH as specified in [9].  NOTE 2: UL TM AUXMC 12.2 kbps, no CRC. See C.6.3.  NOTE 3: UL AM AUXMC 12.2 kbps. See C.6.7. | | | | | |

a) The downlink 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 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 |
| during T1 | -19,5 £ DPCH\_Ec/Ior £ -11,3 | -15,7 £ DPCH\_Ec/Ior £ -7,5 | dB |
| during T2 | -19,5 £ DPCH\_Ec/Ior £ -14,3 | -15,7 £ DPCH\_Ec/Ior £ -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 |
| during T1 | -19,7 £ DPCH\_Ec/Ior £ -11,1 | -15,9 £ DPCH\_Ec/Ior £ -7,3 | dB |
| during T2 | -19,7 £ DPCH\_Ec/Ior £ -14,1 | -15,9 £ DPCH\_Ec/Ior £ -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.

### 7.8.2A Power control in the downlink, initial convergence when DL\_DCH\_FET\_Config is configured by higher layers

Editor’s note: This test case is incomplete. The following aspects are either missing or not yet determined:

* The Test Tolerances applicable to this test are undefined.
* Test procedure may need to be modified to consider call setup and other test parameters.

#### 7.8.2A.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 release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.8.2A.2 Minimum requirements

For the parameters specified in Table 7.8.2A.1 the downlink DPCH\_Ec/Ior power ratio measured values, which are averaged over 50 ms, shall be within the range specified in Table 7.8.2A.2, Table 7.8.2A.3 and Table 7.8.2A.4 more than 90% of the time. T1 equals to 500 ms and it starts 10 ms after the DPDCH physical channel is considered established and the first uplink frame is transmitted. 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. Test requirements in Table 7.8.2A.2, Table 7.8.2A.3 and Table 7.8.2A.4 correspond to DL\_DCH\_FET\_Config is set to 0 with UL in 20ms transmission mode, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and non-Null transmission in the UL, and, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and Null transmission in the UL respectively.

Table 7.8.2A.1: Test parameters for downlink power control

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | | Test 3 | Test 4 |
| Target quality value on DTCH | BLER | 0.01 | | | 0.01 | |
| Initial DPCH\_Ec/Ior | dB | -5.9 | -25.9 | | -5.9 | -25.9 |
| Information Data Rate | kbps | 12.2 | | | 0 | |
| DCCH Presence | - | No | | | | |
|  | dB | -1 | | | | |
|  | dBm/3.84 MHz | -60 | | | | |
| Propagation condition |  | Static | | | | |
| Maximum\_DL\_Power | dB | 7 | | | | |
| Minimum\_DL\_Power | dB | -18 | | -21 | | |
| DL Power Control step size, TPC | dB | 1 | | | | |
| Limited Power Increase | - | "Not used" | | | | |

Table 7.8.2A.2: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -20.6  DPCH\_Ec/Ior  -12.0 | -20.6  DPCH\_Ec/Ior  -12.0 |
| during T2 | dB | -20.6  DPCH\_Ec/Ior  -15.5 | -20.6  DPCH\_Ec/Ior  -15.6 |

Table 7.8.2A.3: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -21.0  DPCH\_Ec/Ior  -11.5 | -21.4  DPCH\_Ec/Ior  -11.6 |
| during T2 | dB | -21.0  DPCH\_Ec/Ior  -15.8 | -21.4  DPCH\_Ec/Ior  -15.2 |

Table 7.8.2A.4: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -21.3  DPCH\_Ec/Ior  -10.6 | -22.1  DPCH\_Ec/Ior  -11.2 |
| during T2 | dB | -21.3  DPCH\_Ec/Ior  -15.0 | -22.1  DPCH\_Ec/Ior  -14.9 |

The reference for this requirement is TS 25.101 [1] clause 8.8.2A.1.

NOTE: DTCH shall be transmitted during the whole test.

#### 7.8.2A.3 Test purpose

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

#### 7.8.2A.4 Method of test

7.8.2A.4.1 Initial conditions

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

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

1) Connect SS 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.

7.8.2A.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 following exception in the RADIO BEARER SETUP messages in table 7.8.2A.4.1, 7.8.2A.4.2 and, with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message These exceptions allows the call to be setup in different DL\_DCH\_FET modes as per test requirements. 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 7.8.2A.5 for the test running. After the transmission of Radio Bearer Setup message, Initial DPCH\_Ec/Ior 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 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 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.

Table 7.8.2A.4.1: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  | Not Present |  |
| 20 ms only |  |  |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.2A.4.2: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | Not Present |  |
| Full |  | NULL |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.8.2A.5 Test Requirements

The test parameters are specified in table 7.8.2A.5.

Table 7.8.2A.5: Test parameters for downlink power control

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | Test 2 | | Test 3 | Test 4 |
| Target quality value on DTCH | BLER | 0.01 | | | 0.01 | |
| Initial DPCH\_Ec/Ior | dB | -5.9 | -25.9 | | -5.9 | -25.9 |
| Information Data Rate | kbps | 12.2 | | | 0 | |
| DCCH Presence | - | No | | | | |
|  | dB | -1 | | | | |
|  | dBm/3.84 MHz | -60 | | | | |
| Propagation condition |  | Static | | | | |
| Maximum\_DL\_Power | dB | 7 | | | | |
| Minimum\_DL\_Power | dB | -18 | | -21 | | |
| DL Power Control step size, TPC | dB | 1 | | | | |
| Limited Power Increase | - | "Not used" | | | | |

a) The downlink power ratio values shall be within the range specified in table 7.8.2A.6, 7.8.2A.7 and 7.8.2A.8 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 7.8.2A.4A during T1 more than 90 % of the time.

Table 7.8.2A.6: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -21.2  DPCH\_Ec/Ior -11.4 | -21.2  DPCH\_Ec/Ior  -11.4 |
| during T2 | dB | -21.2  DPCH\_Ec/Ior  -14.9 | -21.2  DPCH\_Ec/Ior  -14.9 |

Table 7.8.2A.7: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -21.6  DPCH\_Ec/Ior  -10.9 | -22  DPCH\_Ec/Ior  -11 |
| during T2 | dB | -21.6  DPCH\_Ec/Ior  -15.2 | -22  DPCH\_Ec/Ior  -14.6 |

Table 7.8.2A.8: Requirements in downlink power control (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 & Test 2 | Test 3 & Test 4 |
| during T1 | dB | -21.9  DPCH\_Ec/Ior  -10 | -22.7  DPCH\_Ec/Ior  -10.6 |
| during T2 | dB | -21.9  DPCH\_Ec/Ior  -14.4 | --22.7  DPCH\_Ec/Ior  -14.3 |

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 FFS 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 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 |
|  | 5 | | | dB |
|  | -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, 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 |
|  | -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 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 |
|  | 5,6 | | | dB |
|  | -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, TPC | 1 | | | dB |
| Limited Power Increase | "Not used" | | | - |
| NOTE: Power is compared to P-CPICH as specified in [9]. | | | | |

The downlink 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 |
|  | -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 |
|  | -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 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 |
|  | 5 | | | dB |
|  | -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, TPC | 1 | | | dB |
| Limited Power Increase | "Not used" | | | - |
| NOTE 1: *P* is the level corresponding to the average  power ratio - 2 dB compared to the P-CPICH level. The average  power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts.  NOTE 2: Power is compared to P-CPICH as specified in [9]. | | | | |

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

|  |  |  |
| --- | --- | --- |
| Parameter | Test 1, stage 3 | Unit |
|  | -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 power ratio measured values, which are averaged over one slot, over 10 second period. The average of these 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 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 |
|  | 5,6 | | | dB |
|  | -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, TPC | 1 | | | dB |
| Limited Power Increase | "Not used" | | | - |
| NOTE 1: *P* is the level corresponding to the average  power ratio - 2 dB compared to the P-CPICH level. The average  power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts.  NOTE 2: Power is compared to P-CPICH as specified in [9]. Target quality on DCCH as 1(100%) for Test1. | | | | |

The downlink 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 |
|  | -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.

### 7.8.3B Power control in the downlink, wind up effects (Release 6 and later) when DL\_DCH\_FET\_Config is configured by higher layers

#### 7.8.3B.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 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.8.3B.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 value specified in Table 7.8.3B.1 and Table 7.8.3B.2. All parameters used in the three stages are specified in Table 7.8.3B.1 and Table 7.8.3B.2. The downlink power ratio measured values, which are averaged over one slot, during stage 3 shall be lower than the value specified in Table 7.8.3B.3, Table 7.8.3B.4, Table 7.8.3B.5 and Table 7.8.3B.6 more than 90% of the time. Test requirements in Table 7.8.3B.3, Table 7.8.3B.4, Table 7.8.3B.5and Table 7.8.3B.6 correspond to DL\_DCH\_FET\_Config is set to 0 with UL in 20ms transmission mode, DL\_DCH\_FET\_Config is set to 0 with UL in 10ms transmission mode, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and non-Null transmission in the UL, and, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and Null transmission in the UL respectively. Power control of the UE is ON during the test.

Table 7.8.3B.1: Test parameter for downlink power control, wind-up effects (12.2 kbps without DCCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | | |
| **Stage 1** | **Stage 2** | **Stage 3** |
| Time in each stage | s | 5 | 5 | 0.5 |
|  | dB | 5 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | | |
| DCCH Presence |  | No | | |
| Quality target on DTCH | BLER | 0.01 | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power | dB | 7 | min(-6.2,P). Note 1 | 7 |
| Minimum\_DL\_Power | dB | -18 | | |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |
| Note 1: P is the level corresponding to the average power ratio - 2 dB compared to the P-CPICH level. The average power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts. | | | | |

Table 7.8.3B.2: Test parameter for downlink power control, wind-up effects (0 kbps without DCCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | | |
| **Stage 1** | **Stage 2** | **Stage 3** |
| Time in each stage | s | 5 | 5 | 0.5 |
|  | dB | 5 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 0 | | |
| DCCH Presence |  | No | | |
| Quality target on DTCH | BLER | 0.01 | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power | dB | 7 | min(-6.2,P). Note 1 | 7 |
| Minimum\_DL\_Power | dB | -21 | | |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |
| Note 1: P is the level corresponding to the average power ratio - 2 dB compared to the P-CPICH level. The average power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts. | | | | |

Table 7.8.3B.3: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.6 | -17.3 |

Table 7.8.3B.4: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -13.6 | -15.7 |

Table 7.8.3B.5: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.7 | -17.1 |

Table 7.8.3B.6: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in Uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.7 | -16.7 |

The reference for this requirement is TS 25.101 [1] clause 8.8.3A.1

#### 7.8.3B.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 with DL\_DCH\_FET\_Config by higher layers.

#### 7.8.3B.4 Method of test

##### 7.8.3B.4.1 Initial conditions

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

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

1) Connect SS, 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 following exception in the RADIO BEARER SETUP messages in table 7.8.3B.6.1, 7.8.3B.6.2 and 7.8.3B.6.3. These exceptions allows the call to be setup in different DL\_DCH\_FET modes as per test requirements.

3) Enter the UE into loopback test mode and start the loopback test. RF parameters are set up according to table 7.8.3B.7. SS waits 15 seconds and then collects the power ratio measured values, which are averaged over one slot, over 10 second period. The average of these 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.

##### 7.8.3B.4.2 Procedure

1) RF parameters are set up according to table 7.8.3B.7. 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 power ratio during stage 3 according to table 7.8.3B.7.

4) Repeat steps 1) to 3) 328 times.

5) Repeat the test procedure with initial conditions and RF parameters as per table 7.8.3B.8 for 0 kbps without DCCH test.

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 7.8.3B.6.1: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  | Not Present |  |
| 20 ms only |  |  |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.3B.6.2: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.3B.6.3: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | Not Present |  |
| Full |  | NULL |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.8.3B.5 Test Requirements

The test parameters are specified in table 7.8.3B.7 and 7.8.3B.8.

Table 7.8.3B.7: Test parameter for downlink power control, wind-up effects (12.2 kbps without DCCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | | |
| **Stage 1** | **Stage 2** | **Stage 3** |
| Time in each stage | s | 5 | 5 | 0.5 |
|  | dB | 5.6 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | | |
| DCCH Presence |  | No | | |
| Quality target on DTCH | BLER | 0.01 | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power | dB | 7 | min(-6.2,P). Note 1 | 7 |
| Minimum\_DL\_Power | dB | -18 | | |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |
| Note 1: P is the level corresponding to the average power ratio - 2 dB compared to the P-CPICH level. The average power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts. | | | | |

Table 7.8.3B.8: Test parameter for downlink power control, wind-up effects (0 kbps without DCCH)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1** | | |
| **Stage 1** | **Stage 2** | **Stage 3** |
| Time in each stage | s | 5 | 5 | 0.5 |
|  | dB | 5.6 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 0 | | |
| DCCH Presence |  | No | | |
| Quality target on DTCH | BLER | 0.01 | | |
| Propagation condition |  | Case 4 | | |
| Maximum\_DL\_Power | dB | 7 | min(-6.2,P). Note 1 | 7 |
| Minimum\_DL\_Power | dB | -21 | | |
| DL Power Control step size, TPC | dB | 1 | | |
| Limited Power Increase | - | "Not used" | | |
| Note 1: P is the level corresponding to the average power ratio - 2 dB compared to the P-CPICH level. The average power ratio is measured during the initialisation stage after the power control loop has converged before the actual test starts. | | | | |

The downlink power ratio values, which are averaged over one slot during stage 3, shall be lower than the level specified in table 7.8.3B.9, 7.8.3B.10, 7.8.3B.11 and 7.8.3B.12 during stage 3 more than 90 % of the time.

Table 7.8.3B.9: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.5 | -17.2 |

Table 7.8.3B.10: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -13.5 | -15.6 |

Table 7.8.3B.11: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.6 | -17 |

Table 7.8.3B.12: Requirements in downlink power control, wind-up effects (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in Uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.2)** | **Test 1, stage 3**  **Reference Measurement Channel (A.3A.0)** |
|  | dB | -14.6 | -16.6 |

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  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 |
|  | dB | 9 | | |
|  | 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, 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 |
|  | 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 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 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 |
|  | dB | 9.6 | | |
|  | 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, 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 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 |
|  | 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 |
|  | 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.

### 7.8.4A Power control in the downlink, different transport formats when DL\_DCH\_FET\_Config is configured by higher layers

#### 7.8.4A.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 to release 12 and later releases for all types of UTRA for the FDD UE that support DCH Enhancement for UMTS.

#### 7.8.4A.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 A.3A.0 and A.3A.2. 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 7.8.4A.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 7.8.4A.1, the downlink  power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 7.8.4A.2, Table 7.8.4A.3, Table 7.8.4A.4and Table 7.8.4A.5 more than 90% of the time. BLER shall be as shown in Table 8.34BB, Table 8.34BC, Table 8.34BD and Table 8.34BE. Power control in downlink is ON during the test. Test requirements in Table 7.8.4A.2, Table 7.8.4A.3, Table 7.8.4A.4 and Table 7.8.4A.5 correspond to DL\_DCH\_FET\_Config is set to 0 with UL in 20ms transmission mode, DL\_DCH\_FET\_Config is set to 0 with UL in 10ms transmission mode, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and non-Null transmission in the UL, and, DL\_DCH\_FET\_Config is set to 1 with UL in 10ms transmission mode and Null transmission in the UL respectively.

Table 7.8.4A.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 |
|  | dB | 9 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| DCCH Presence |  | No | | |
| 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, 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 [4].

Table 7.8.4A.2: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.7 | -19.8 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.3: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -14.4 | -16.6 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.4: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.5 | -19.8 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.5: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.5 | -19.8 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

The reference for this requirement is TS 25.101 [1] clause 8.8.4A.1.

#### 7.8.4A.3 Test purpose

To verify that the UE outer loop power control works properly with different transport formats with DL\_DCH\_FET\_Config by higher layers.

#### 7.8.4A.4 Method of test

##### 7.8.4A.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 following exception in the RADIO BEARER SETUP messages in table 7.8.4A.5.1, 7.8.4A.5.2, 7.8.4A.5.3 and with the exception of the information element of Target quality on DCCH as 1(100%) in the RRC CONNECTION SETUP message. These exceptions allows the call to be setup in different DL\_DCH\_FET modes as per test requirements and the outer loop 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.

##### 7.8.4A.4.2 Procedure

1) RF parameters are set up according to table 7.8.4A.6.

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 power ratio according to table 7.8.4A.6.

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 power ratio according to table 7.8.4A.6.

Note: The measurement should not start until after power control has converged.

Table 7.8.4A.5.1: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  | Not Present |  |
| 20 ms only |  |  |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.4A.5.2: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | NULL |  |
| Full |  | Not Present |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

Table 7.8.4A.5.3: Contents of Radio bearer setup message (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| DCH Enhancements Info FDD |  |  | Rel-12 |
| CHOICE Configuration info |  |  | Rel-12 |
| Continue |  | NULL |  |
| New Configuration |  |  |  |
| CHOICE UL Transmission Mode |  |  | Rel-12 |
| 10 ms only |  |  |  |
| 20 ms only |  | Not Present |  |
| 10ms or 20ms |  | Not Present |  |
| Uplink Transmission Mode switching parameters |  |  | Rel-12 |
| K |  | 5 | Rel-12 |
| L |  | 10 | Rel-12 |
| M |  | 10 | Rel-12 |
| CHOICE DL FET Mode |  |  |  |
| Basic |  | Not Present |  |
| Full |  | NULL |  |
| Early DCH quality target |  | Not Present | Rel-12 |
| Early DCH quality target slot |  | Not Present | Rel-12 |
| TrCh Concatenation Info |  | Not Present | Rel-12 |
| DCH ID |  | Not Present | Rel-12 |

#### 7.8.4.5 Test Requirements

The test parameters are specified in table 7.8.4A.6

Table 7.8.4A.6: 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 |
|  | dB | 9.6 | | |
|  | dBm/3.84 MHz | -60 | | |
| Information Data Rate | kbps | 12.2 | 0 | |
| DCCH Presence |  | No | | |
| 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, 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 7.8.4A.7, table 7.8.4A.8, table 7.8.4A.9 and table 7.8.4A.10.

b) The downlink power ratio values, which are averaged over one slot, shall be below the values in table 7.8.4A.7, table 7.8.4A.8, table 7.8.4A.9 and table 7.8.4A.10 for more than 90 % of the time.

Table 7.8.4A.7: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 0 with 20ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.6 | -19.7 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.8: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 0 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -14.3 | -16.5 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.9: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.4 | -19.7 |
| Measured quality on DTCH | BLER | 0.0130% | 0.0130% |

Table 7.8.4A.10: Requirements in downlink power control in case of different transport formats (DL\_DCH\_FET\_Config is set to 1 with 10ms UL transmission mode and Null transmission in uplink)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1, stage 1 | Test 1, stage 2 |
|  | dB | -17.4 | -19.7 |
| 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 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 |
|  | 9 | -1 | dB |
|  | -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, 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 |
|  | -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 1with 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 ms 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 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 |  |  |
| - PRACH TFCS | Not Present |  |
| - CHOICE Mode | FDD |  |
| - TFC subset | Not Present |  |
| - UL DCH TFCS |  |  |
| - CHOICE TFCI signalling | Normal |  |
| - TFCI Field 1 information |  |  |
| - CHOICE TFCS representation | Complete reconfiguration |  |
| - TFCS complete reconfiguration information |  |  |
| - CHOICE CTFC Size | 2 bit CTFC |  |
| - CTFC information | 2 TFCs |  |
| - 2bit CTFC | 0 |  |
| - Power offset Information |  |  |
| - CHOICE Gain Factors | computedGainFactors |  |
| - Reference TFC ID | 0 |  |
| - CHOICE mode | FDD |  |
| - Power offset Pp-m | Not Present |  |
| - 2bit CTFC | 1 |  |
| - Power offset Information |  |  |
| - CHOICE Gain Factors | signalledGainFactors |  |
| - CHOICE mode | FDD |  |
| - Gain factor ßc | 11 |  |
| - Gain factor ßd | 15 |  |
| - Reference TFC ID | 0 |  |
| - CHOICE mode | FDD |  |
| - Power offset Pp-m | Not Present |  |
| Uplink DPCH info |  | Rel-6 |
| - Uplink DPCH power control info |  |  |
| - ACK | 5 |  |
| - NACK | 5 |  |
| - Ack-Nack repetition factor | 3(required for continuous HS-DPCCH signal) |  |
| Downlink HS-PDSCH Information |  | Rel-6 |
| - HS-SCCH Info |  |  |
| - CHOICE mode | FDD |  |
| - DL Scrambling Code | Not present |  |
| - HS-SCCH Channelisation Code Information |  |  |
| - HS-SCCH Channelisation Code | 2 |  |
| - Measurement Feedback Info |  |  |
| - CHOICE mode | FDD |  |
| - POhsdsch | 3 dB |  |
| - CQI Feedback cycle, k | 4 ms |  |
| - CQI repetition factor | 2(required for continuous HS-DPCCH signal) |  |
| - CQI | 5 (corresponds to 0dB in relative power offset) |  |
| - CHOICE mode | FDD (no data) |  |
| 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 |  |
| - 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 |
|  | 9,6 | -0,4 | dB |
|  | -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, 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 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 |
|  | -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/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. 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 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 |
|  | 9 | | | | dB |
|  | -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, 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 |
|  | -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 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 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 |
|  | 9,6 | | | | dB |
|  | -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, 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 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) Test3: The downlink 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 |
|  | -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 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 |
|  | 9 | | dB |
|  | -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, 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 |
|  | -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 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 |
|  | 9,6 | | dB |
|  | -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, 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 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 |
|  | -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\_Ec/Ior value.

### 7.10.2 Minimum requirements

For the parameters specified in table 7.10.1 the average downlink 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 |
|  | -1 | | | -3 | | | dB |
|  | -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 |  | 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/Ior, Ioc, and Ior/Ioc 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.

Table7.10.3: 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.

1. 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.

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 1-6 as specified table 7.10.4 and table 7.10.5.

4. Enter the UE into loopback test mode 2 and start the loopback test.

5. 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 |
|  | -0,7 | | | -2,4 | | | dB |
|  | -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/Ior specified in table 7.10.5.

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

|  |  |  |  |
| --- | --- | --- | --- |
| Test Number |  | 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/Ior, Ioc, and Ior/Ioc 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 (Pm-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 (Pm-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 (Np) | - | 72 | |
| Phase reference | - | P-CPICH | |
|  | dBm/3.84 MHz | -60 | |
|  | 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 (Pm-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 (Pm-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 (Np) | - | 72 | |
| Phase reference | - | P-CPICH | |
|  | dBm/3.84 MHz | -60 | |
|  | 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 Pfa and probability of correct detection Pd. Pfa is defined as a conditional probability of detection of AI signature given that a AI signature was not transmitted. Pd 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 |
|  | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
|  | 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 Pinitial. 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=Pinitial.

5) SS does not send AI. If UE sends a new preamble a success for calculating Pfa is recorded. This step is repeated until UE stops sending preambles. SS does not calculate Pfa 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 Pfa is recorded and test continues from step 3. If number of preamble cycles M ≠ Mmax, a new preamble cycle is initiated and test continues from step 4. If number of preamble cycles M = Mmax 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 Pd is recorded. If UE does not stop sending preambles, a failure for calculating Pd 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 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 |

### 7.12.5 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 |
|  | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
|  | 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 |
|  | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
| Number of resources assumed for E-DCH random access | - | 32 |
|  | 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 Pinitial. 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=Pinitial.

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 |
|  | dBm/3.84 MHz | -60 |
| Number of other transmitted AI signatures on AICH | - | 0 |
| Number of resources assumed for E-DCH random access | - | 32 |
|  | 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 | dB | -10 |
| F-DPCH | dB | -10 |
| F-DPCH slot format | - | 0 |
| Îor1 | dBm/3.84 MHz | -60 |
| Power-Control-Algorithm | - | Algorithm 1 |
| UL Power Control step size, TPC | 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 |
| 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 1with 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 dBm +-2 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 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 |  |  |
| - PRACH TFCS | Not Present |  |
| - CHOICE Mode | FDD |  |
| - TFC subset | Not Present |  |
| - UL DCH TFCS |  |  |
| - CHOICE TFCI signalling | Normal |  |
| - TFCI Field 1 information |  |  |
| - CHOICE TFCS representation | Complete reconfiguration |  |
| - TFCS complete reconfiguration information |  |  |
| - CHOICE CTFC Size | 2 bit CTFC |  |
| - CTFC information | 2 TFCs |  |
| - 2bit CTFC | 0 |  |
| - Power offset Information |  |  |
| - CHOICE Gain Factors | computedGainFactors |  |
| - Reference TFC ID | 0 |  |
| - CHOICE mode | FDD |  |
| - Power offset Pp-m | Not Present |  |
| - 2bit CTFC | 1 |  |
| - Power offset Information |  |  |
| - CHOICE Gain Factors | signalledGainFactors |  |
| - CHOICE mode | FDD |  |
| - Gain factor ßc | 11 |  |
| - Gain factor ßd | 15 |  |
| - Reference TFC ID | 0 |  |
| - CHOICE mode | FDD |  |
| - Power offset Pp-m | Not Present |  |
| Uplink DPCH info |  | Rel-6 |
| - Uplink DPCH power control info |  |  |
| - ACK | 5 |  |
| - NACK | 5 |  |
| - Ack-Nack repetition factor | 1 (ACKs/NACKs are not repeated) |  |
| Downlink HS-PDSCH Information |  | Rel-6 |
| - HS-SCCH Info |  |  |
| - CHOICE mode | FDD |  |
| - DL Scrambling Code | Not present |  |
| - HS-SCCH Channelisation Code Information |  |  |
| - HS-SCCH Channelisation Code | 2 |  |
| - Measurement Feedback Info |  |  |
| - CHOICE mode | FDD |  |
| - POhsdsch | 7 dB |  |
| - CQI Feedback cycle, k | 0 ms (CQI reports are not sent) |  |
| - CQI repetition factor | 1 (CQI reports are not repeated) |  |
| - CQI | 5 (corresponds to 0dB in relative power offset) |  |
| - CHOICE mode | FDD (no data) |  |
| 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 |  |
| - 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 DPCCH 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 DPCCH transmission

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Test 1 |
| Phase reference | - | P-CPICH |
| HS-SCCH\_1 | dB | -10 |
| F-DPCH | dB | -10 |
| F-DPCH slot format | - | 0 |
| Îor1 | dBm/3.84 MHz | -60 |
| Power-Control-Algorithm | - | Algorithm 1 |
| UL Power Control step size, TPC | 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 |
| 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 7.13.4: Test requirements for UE UL power control operation  
with discontinuous UL DPCCH transmission

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