9 Performance requirements for HSDPA

9.1 General

The performance requirements for the UE in this clause are specified for the measurement channels specified in Annex C, the propagation conditions specified in Annex D and the Down link Physical channels specified in Annex E. 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.

A UE with one antenna connector may also fulfil the enhanced performance requirements Type 1 and Type 3. The levels of the test signal are applied to the single antenna connector 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.

When DTCH has been configured on downlink DCH then DTCH Data shall be continuously transmitted on downlink DCH during the measurement period.

The MAC headers on HS-DSCH shall be according to Annex C.9A.

The common RF test conditions of Performance requirements are defined in clause E.5, and each test conditions in clause 9 should refer to clause E.5. Individual test conditions are defined in the paragraph of each test.

All throughput measurements in clause 9 shall be performed according to the general rules for statistical testing in Annex F.6.3.

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

The requirement for a FDD UE that support HSDPA shall be tested according to the declared UE HS-DSCH category. For Release 6 and later UEs that support either the optional Type 1 or the Type 2 enhanced performance requirement, the UE shall be tested according to this enhanced performance requirement as well. For Release 7 and later UEs that support optional Type 3 enhanced performance requirement, the UE shall be tested according to this enhanced performance requirement as well. For Release 8 and later UEs that support optional Type 3i enhanced performance requirement, the UE shall be tested according to both type3 and type 3i enhanced performance requirement as well.

For the requirements for UEs supporting HS-DSCH categories 21, 22, 23, 24, 25, 26, 27, 28, 19, 30, 31 or 32, when the carriers are located in the same frequency band, the spacing of the carrier frequencies of the two cells shall be 5 MHz.9.1.1 Definition of Additive White Gaussian Noise (AWGN) Interferer

See clause D.1.1.

9.2 Demodulation of HS-DSCH (Fixed Reference Channel)

The minimum performance requirement for a particular UE belonging to one of the HS-DSCH categories 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 are determined according to Table 9.2.1.

The performance requirements for a particular UE belonging to one of the HS-DSCH categories 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 and supporting the optional enhanced performance requirements type 1 are determined according to Table 9.2.2.

The performance requirements for a particular UE belonging to one of the HS-DSCH categories 7, 8, 9 or 10, and supporting the optional enhanced performance requirements type 2 are determined according to Table 9.2.3.

The minimum performance requirements for a particular UE belonging to HS-DSCH category 13 or 14 are determined according to Table 9.2.3.

The performance requirements for a particular UE belonging to either of HS-DSCH categories 7, 8, 9, 10, 13 or 14, and supporting the optional enhanced performance requirements type 3 are determined according to Table 9.2.3A.

The minimum performance requirements for a particular UE belonging to one of the HS-DSCH categories 15, 16, 17, 18, 19 and 20 are determined according to Table 9.2.3A.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19 or 20 and supporting the optional enhanced performance requirements type 3i are determined according to Table 9.2.3B.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 21, 22, 23 and 24 are determined according to Table 9.2.3C.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 21, 22, 23, 24, 25, 26, 27 and 28 and supporting the optional enhanced performance requirements type 3 are determined according to Table 9.2.3D.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 21, 22, 23, 24, 25, 26, 27 or 28 and supporting the optional enhanced performance requirements type 3i are determined according to Table 9.2.3E.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 29 and 31 are determined according to Table 9.2.3F.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 29, 30, 31 and 32 and supporting the optional enhanced performance requirements type 3 are determined according to Table 9.2.3H.

The minimum performance requirements for a particular UE supporting one of the HS-DSCH categories 29, 30, 31 and 32 and supporting the optional enhanced performance requirements type 3i are determined according to Table 9.2.3G.

A UE supporting one of categories 21, 22, 23, 24, 29 or 31 shall support either enhanced receiver type 2 requirements, or enhanced receiver type 3 requirements, or enhanced receiver type 3i requirements applicable for the other categories supported by this UE.

A UE supporting one of categories 21, 22, 23, 24, 29 or 31 supporting enhanced receiver type 3 requirements shall support either enhanced receiver type 3 requirements, or enhanced receiver type 3i requirements applicable for the other categories supported by this UE.

A UE supporting one of categories 21, 22, 23, 24, 29 or 31 supporting enhanced receiver type 3i requirements shall support enhanced receiver type 3i requirements applicable for the other categories supported by this UE.

Table 9.2.1: FRC for minimum performance requirements for different HS-DSCH categories

HS-DSCH category	Corresponding requirement		
	Single Link (Note 1)	Open Loop Diversity	Closed Loop Diversity
Category 1	H-Set 1	H-Set 1	H-Set 1
Category 2	H-Set 1	H-Set 1	H-Set 1
Category 3	H-Set 2	H-Set 2	H-Set 2
Category 4	H-Set 2	H-Set 2	H-Set 2
Category 5	H-Set 3	H-Set 3	H-Set 3
Category 6	H-Set 3	H-Set 3	H-Set 3
Category 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 9	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 10	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 11	H-Set 4	H-Set 4	H-Set 4
Category 12	H-Set 5	H-Set 5	H-Set 5
NOTE 1: Single link minimum performance requirements for Categories 7-10 in Pedestrian A with $\hat{I}_{or}/I_{oc}$ =10dB are set according to H-Set 6. Requirements in other conditions are according to H-Set 3. NOTE 2: For UE supporting the minimum performance requirements for HS-DSCH the minimum requirements for HS-SCCH detection for single link are determined in Table 9.4.1.2 and for open loop transmit diversity in Table 9.4.2.2.			

Table 9.2.2: FRC for enhanced performance requirements type 1 for different HS-DSCH categories

HS-DSCH category	Corresponding requirement		
	Single Link (Note 1)	**Open Loop Diversity**	**Closed Loop Diversity**
Category 1	H-Set 1	H-Set 1	H-Set 1
Category 2	H-Set 1	H-Set 1	H-Set 1
Category 3	H-Set 2	H-Set 2	H-Set 2
Category 4	H-Set 2	H-Set 2	H-Set 2
Category 5	H-Set 3	H-Set 3	H-Set 3
Category 6	H-Set 3	H-Set 3	H-Set 3
Category 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 9	H-Set 6, H-Set 3	H-Set 3	H-Set 3
Category 10	H-Set 6, H-Set 3	H-Set 3	H-Set 3
NOTE 1: Single link enhanced performance requirements type 1 for Categories 7-10 in Pedestrian A with $\hat{I}_{or}/I_{oc}$ =10dB are set according to H-Set 6. Requirements in other conditions are according to H-Set 3. NOTE 2: For UE supporting the enhanced performance requirements type 1 for HS-DSCH the requirements for HS-SCCH detection for single link are determined in Table 9.4.1A.2 and for open loop transmit diversity in Table 9.4.2A.2.			

Table 9.2.3: FRC for enhanced performance requirements type 2 for different HS-DSCH categories

HS-DSCH category	Corresponding requirement		
	Single Link (Note 1)	**Open Loop Diversity (Note 2)**	**Closed Loop Diversity (Note 3)**
Category 7	H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3
Category 8	H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3
Category 9	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-set 6, H-Set 3
Category 10	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-set 6, H-Set 3
Category 13	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3
Category 14	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3
NOTE 1: Single link enhanced performance requirements type 2 for Categories 9, 10, 13 and 14 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10. Single link enhanced performance requirements type 2 for Categories 13 and 14 with $\hat{I}_{or}/I_{oc}$ = 15 and 18 dB is set according to H-Set 8. Single link enhanced performance requirements type 2 for Categories 7, 8, 9, 10, 13 and 14 with $\hat{I}_{or}/I_{oc}$ =10dB are set according to H-Set 6. Requirements in other conditions are according to H-Set 3 minimum performance requirements. NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 minimum performance requirements. NOTE 3: Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7, 8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and E_c/I_{or} =-3dB are set according to H-Set 6. Requirements in other conditions are set according to H-Set 3 minimum performance requirements. NOTE 4: For UE supporting the enhanced performance requirements type 2 for HS-DSCH the minimum requirements for HS-SCCH detection for single link are determined in Table 9.4.1.2 and for open loop transmit diversity in Table 9.4.2.2.			

Table 9.2.3A: FRC for enhanced performance requirements type 3 for different HS-DSCH categories

HS-DSCH category	Corresponding requirement			
	Single Link (Note 1)	**Open Loop Diversity (Note 2)**	**Closed Loop Diversity (Note 3)**	**MIMO (Note 4)**
Category 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 9	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 10	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 13	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 14	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 15	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 16	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 17	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 18	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 19	H-Set 11, H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 11, H-Set 9
Category 20	H-Set 11, H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 11, H-Set 9

NOTE 1: Single link enhanced performance requirements type 3 for Categories 9, 10, 13 - 20 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10.

Single link enhanced performance requirements type 3 for Categories 13, 14, 17 - 20 with $\hat{I}_{or}/I_{oc}$ = 15 dB and 18 dB are set according to H-Set 8.

Single link enhanced performance requirements type 3 for Categories 7-10, 13-20 with $\hat{I}_{or}/I_{oc}$ =10dB and $\hat{I}_{or}/I_{oc}$ =5dB are set according to H-Set 6. Requirements in other conditions are according to H-Set 3 type1 enhanced performance requirements.

NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.

NOTE 3: Closed loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.

NOTE 4: MIMO requirements for categories 15-20, with $\hat{I}_{or}/I_{oc}$ = 6 and 10 dB are set according to H-Set 9.MIMO requirements for categories 19-20, with $\hat{I}_{or}/I_{oc}$ = 18 dB are set according to H-Set 11.

NOTE 5: For UE supporting the enhanced performance requirements type 3 for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1.2 and for open loop transmit diversity in Table 9.4.2A.2.

NOTE 6: For UEs supporting MIMO for HS-DSCH the requirements for HS-SCCH Type 3 detection are determined in Tables 9.4.3.2 and Table 9.4.3.3.

Table 9.2.3B: FRC for enhanced performance requirements type 3i for different HS-DSCH categories

HS-DSCH category	Corresponding requirement			
	Single Link (Note 1)	**Open Loop Diversity (Note 2)**	**Closed Loop Diversity (Note 3)**	**MIMO (Note 4)**
Category 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 9	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 10	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 13	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 14	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Category 15	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 16	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 17	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 18	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Category 19	H-Set 11, H-Set-10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 11, H-Set 9
Category 20	H-Set-11, H-Set-10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 11, H-Set 9

NOTE 1: Single link enhanced performance requirements type 3i for Categories 7-20 with $\hat{I}_{or}/I_{oc}$' = 0dB are set according to H-Set 6. Requirements in other conditions are according to type 3 enhanced performance requirements.

NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.

NOTE 3: Closed loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.

NOTE 4: MIMO requirements for categories 15-20, with $\hat{I}_{or}/I_{oc}$ = 6 and 10 dB are set according to H-Set 9. MIMO requirements for categories 19-20, with $\hat{I}_{or}/I_{oc}$ = 18 dB are set according to H-Set 11.

NOTE 5: For UE supporting the enhanced performance requirements type 3i for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1.2 and for open loop transmit diversity in Table 9.4.2A.2.

NOTE 6: For UE supporting MIMO for HS-DSCH the requirements for HS-SCCH Type 3 detection are determined in Tables 9.4.3.2 and Table 9.4.3.3.

Table 9.2.3C: FRC for enhanced performance requirements type 2 for different DC-HSDPA and DB-DC-HSDPA categories

HS-DSCH category	Corresponding requirement		
	Single Link (Note 1)	**Open Loop Diversity (Note 2)**	**Closed Loop Diversity**
Category 21	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A
Category 22	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A
Category 23	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A
Category 24	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A

NOTE 1: Single link enhanced performance requirements type 2 for categories 21, 22, 23 and 24 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10A.

Single link enhanced performance requirements type 2 for categories 23 and 24 with $\hat{I}_{or}/I_{oc}$ = 15 and 18 dB are set according to H-Set 8A.

Single link enhanced performance requirements type 2 for categories 21, 22, 23 and 24 with $\hat{I}_{or}/I_{oc}$ =10dB are set according to H-Set 6A.

Single link requirements for categories 21, 22, 23 and 24 in other conditions are according to H-Set 3A minimum performance requirements.

NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3A minimum performance requirements.

NOTE 3: For UE supporting the enhanced performance requirements type 2 for HS-DSCH the minimum requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1.2 and for open loop transmit diversity in Table 9.4.2.2.

NOTE 4: When the UE supports MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and TBD and for HS-SCCH type 3 in Table 9.4.3.2.

Table 9.2.3D: FRC for enhanced performance requirements type 3 for different DC-HSDPA and DB-DC-HSDPA categories

HS-DSCH category	Corresponding requirement			
	Single Link (Note 1)	**Open Loop Diversity (Note 2)**	**Closed Loop Diversity**	**MIMO**
Category 21	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 22	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 23	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 24	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 25	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A
Category 26	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A
Category 27	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 11A, H-Set 9A
Category 28	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 11A, H-Set 9A

NOTE 1: Single link enhanced performance requirements type 3 for categories 21, 22, 23, 24, 25, 26, 27 and 28 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10A.
Single link enhanced performance requirements type 3 for categories 23, 24, 27 and 28 with $\hat{I}_{or}/I_{oc}$ = 15 dB and 18 dB are set according to H-Set 8A.
Single link enhanced performance requirements type 3 for categories 21, 22, 23, 24, 25, 26, 27 and 28 with $\hat{I}_{or}/I_{oc}$=10dB and $\hat{I}_{or}/I_{oc}$=5dB are set according to H-Set 6A.
Single link minimum requirements for categories 21, 22, 23, 24, 25, 26, 27 and 28 in other conditions are according to H-Set 3A type 1 enhanced performance requirements.

NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3A type 1 enhanced performance requirements.

NOTE 3: For UE supporting the enhanced performance requirements type 3 for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1A.2 and for open loop transmit diversity in Table 9.4.2A.2.

NOTE 4: For UE supporting the enhanced performance requirements type 3 for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1A.2 and for open loop transmit diversity in Table 9.4.2A.2.

NOTE 5: For UE supporting MIMO for HS-DSCH the requirements for HS-SCCH Type 3 detection are determined in Tables 9.4.3.2 and Table 9.4.3.3.

NOTE 6: For UE supporting the MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and TBD and for HS-SCCH type 3 in Table 9.4.3.2.

Table 9.2.3E: FRC for enhanced performance requirements type 3i for different DC-HSDPA and DB-DC-HSDPA categories

HS-DSCH category	Corresponding requirement			
	Single Link (Note 1)	Open Loop Diversity (Note 2)	Closed Loop Diversity	MIMO
Category 21	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 22	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 23	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 24	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A
Category 25	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A
Category 26	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A
Category 27	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 11A, H-Set 9A
Category 28	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 11A, H-Set 9A

NOTE 1: Single link enhanced performance requirements type 3i for Categories 21, 22, 23, 24, 25, 26, 27 and 28 with $\hat{I}_{or}/I_{oc}$' = 0dB are set according to H-Set 6A. Requirements in other conditions are according to type 3 enhanced performance requirements.
NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.
NOTE 3: For UE supporting the enhanced performance requirements type 3i for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.4.1A.2 and for open loop transmit diversity in Table 9.4.2A.2
NOTE 4: For UE supporting the MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and TBD and for HS-SCCH type 3 in Table 9.4.3.2.

Table 9.2.3F: FRC for enhanced performance requirements type 2 for different 4C-HSDPA categories

HS-DSCH category	Corresponding requirement		
	Single Link (Note 1)	Open Loop Diversity (Note 2)	Closed Loop Diversity
Category 29	H-Set-10B, H-Set 8B, H-Set 6B, H-Set 3B	H-Set 3B	N/A
Category 31	H-Set-10C, H-Set 8C, H-Set 6C, H-Set 3C	H-Set 3C	N/A

NOTE 1: Single link enhanced performance requirements type 2 for categories 29 and 31 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10B and H-Set 10C respectively.

Single link enhanced performance requirements type 2 for categories 29 and 31 with $\hat{I}_{or}/I_{oc}$ = 15 and 18 dB are set according to H-Set 8B and H-Set 8C respectively.

Single link enhanced performance requirements type 2 for categories 29 and 31 with $\hat{I}_{or}/I_{oc}$ =10dB are set according to H-Set 6B and H-Set 6C respectively.
Single link requirements for categories 29 and 31 in other conditions are according to H-Set 3B minimum performance requirements and H-Set 3C minimum performance requirements respectively.
NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3B minimum performance requirements and H-Set 3C minimum performance requirements.
NOTE 3: For UE supporting the enhanced performance requirements type 2 for HS-DSCH the minimum requirements for HS-SCCH Type 1 detection for single link are determined in Table TBD and for open loop transmit diversity in Table TBD.
NOTE 4: For UE supporting the MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and for HS-SCCH type 3 in Table TBD.

Table 9.2.3G: FRC for enhanced performance requirements type 3i for different 4C-HSDPA categories

HS-DSCH category	Corresponding requirement			
	Single Link (Note 1)	Open Loop Diversity (Note 2)	Closed Loop Diversity	MIMO
Category 29	H-Set-10B, H-Set 6B, H-Set 8B, H-Set 3B	H-Set 3B	N/A	N/B
Category 30	H-Set-10B, H-Set 6B, H-Set 8B, H-Set 3B	H-Set 3B	N/A	H-Set 11B, H-Set 9B
Category 31	H-Set 10C, H-Set 8C, H-Set 6C, H-Set 3C	H-Set 3C	N/A	N/A
Category 32	H-Set 10C, H-Set 8C, H-Set 6C, H-Set 3C	H-Set 3C	N/A	H-Set 11C, H-Set 9C
NOTE 1: Single link enhanced performance requirements type 3i for Categories 29, 30 with $\hat{I}_{or}/I_{oc}$' = 0dB are set according to H-Set 6B. Single link enhanced performance requirements type 3i for Categories 31, 32 with $\hat{I}_{or}/I_{oc}$' = 0dB are set according to H-Set 6C. Requirements in other conditions are according to type 3 enhanced performance requirements. NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements. NOTE 3: For UE supporting the enhanced performance requirements type 3i for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table 9.51A and for open loop transmit diversity in Table TBD. NOTE 4: For UE supporting the MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and for HS-SCCH type 3 in Table TBD. NOTE 5: For UE supporting MIMO for HS-DSCH the requirements for HS-SCCH Type 3 detection are determined in Tables TBD.				

Table 9.2.3H: FRC for enhanced performance requirements type 3 for different 4C-HSDPA categories

HS-DSCH category	Corresponding requirement			
	Single Link (NOTE 1)	Open Loop Diversity (NOTE 2)	Closed Loop Diversity	MIMO

Category 29	H-Set 10B, H-Set 6B, H-Set 8B, H-Set 3B	H-Set 3B	N/A	N/B
Category 30	H-Set-10B, H-Set 6B, H-Set 8B, H-Set 3B	H-Set 3B	N/A	H-Set 11B, H-Set 9B
Category 31	H-Set 10C, H-Set 8C, H-Set 6C, H-Set 3C	H-Set 3C	N/A	N/A
Category 32	H-Set 10C, H-Set 8C, H-Set 6C, H-Set 3C	H-Set 3C	N/A	H-Set 11C, H-Set 9C

NOTE 1: Single link enhanced performance requirements type 3 for categories 29, 30 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10B.

Single link enhanced performance requirements type 3 for categories 31, 32 with $\hat{I}_{or}/I_{oc}$ = 4 dB and 8 dB are set according to H-Set 10C.

Single link enhanced performance requirements type 3 for categories 29, 30 with $\hat{I}_{or}/I_{oc}$ = 15 dB and 18 dB are set according to H-Set 8B.

Single link enhanced performance requirements type 3 for categories 31, 32 with $\hat{I}_{or}/I_{oc}$ = 15 dB and 18 dB are set according to H-Set 8C.

Single link enhanced performance requirements type 3 for categories 29, 30 with $\hat{I}_{or}/I_{oc}$ =10dB and $\hat{I}_{or}/I_{oc}$ =5dB are set according to H-Set 6B.

Single link enhanced performance requirements type 3 for categories 31, 32 with $\hat{I}_{or}/I_{oc}$ =10dB and $\hat{I}_{or}/I_{oc}$ =5dB are set according to H-Set 6C.
Single link minimum requirements for categories 29, 30 in other conditions are according to H-Set 3B type 1 enhanced performance requirements.
Single link minimum requirements for categories 31, 32 in other conditions are according to H-Set 3C type 1 enhanced performance requirements.

NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3B type 1 enhanced performance requirements and H-Set 3C type 1 enhanced performance requirements.

NOTE 3: MIMO requirements for categories 30 and 32, with $\hat{I}_{or}/I_{oc}$ = 6 and 10 dB are set according to H-Set 9B and H-Set 9C respectively. MIMO requirements for categories 30 and 32, with $\hat{I}_{or}/I_{oc}$ = 18 dB are set according to H-Set 11B and H-set 11C respectively.

NOTE 4: For UE supporting the enhanced performance requirements type 3 for HS-DSCH the requirements for HS-SCCH Type 1 detection for single link are determined in Table TBD and for open loop transmit diversity in Table TBD.

NOTE 5: For UE supporting MIMO for HS-DSCH the requirements for HS-SCCH Type 3 detection are determined in Tables TBD.

NOTE 6: For UE supporting the MIMO only with single-stream restriction the additional minimum requirements for HS-DSCH are given in Table TBD and for HS-SCCH type 3 in Table TBD.

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4:

Table 9.2.4: Node-B Emulator Behaviour in response to ACK/NACK/DTX

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

NOTE: Performance requirements in this section assume a sufficient power allocation to HS-SCCH_1 so that probability of reporting DTX is very low.

The reference for this requirement is TS 25.101 [1] clauses 9.2.

9.2.1 Single Link Performance

The test cases in the following sections 9.2.1A to 9.2.1I define the Single Link Performance tests for the different H-Sets for the different HS-DSCH Categories as defined in tables 9.2.1, 9.2.2, 9.2.3 and 9.2.3A.

9.2.1A Single Link Performance - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.1A.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 6.

9.2.1A.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1A.1 and 9.2.1A.3 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1A.2 and 9.2.1A.4.

Table 9.2.1A.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1A.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	65	309
		-3	N/A	423
2	PB3	-6	23	181
		-3	138	287
3	VA30	-6	22	190
		-3	142	295
4	VA120	-6	13	181
		-3	140	275

*
NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1
NOTE 2: For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)
NOTE 3: For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)

Table 9.2.1A.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1A.4: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} **(dB)**	**T-put** R **(kbps) *** $\hat{I}_{or} / I_{oc}$ **= 10 dB**
1	PA3	-6	198
		-3	368
2	PB3	-6	34
		-3	219
3	VA30	-6	47
		-3	214
4	VA120	-6	28
		-3	167
*) NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. NOTE 2: For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer). NOTE 3: For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer).			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1 and 9.2.1.2.

9.2.1A.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1A.4 Method of test

9.2.1A.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 the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to tables 9.2.1A.1 and 9.2.1A.3 and levels according to tables 9.2.1A.5 to 9.2.1A.8 as appropriate. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBSequence must be at least 4664 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number i is continued exactly after 6 TTIs.

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

9.2.1A.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1A.5 to 9.2.1A.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1 and F.6.3.5.2.2.

9.2.1A.5 Test Requirements

Tables 9.2.1A.5 to 9.2.1A.8 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1A.5: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1A.6: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	309
		-2.9	N/A	423
2	PB3	-5.9	23	181
		-2.9	138	287
3	VA30	-5.9	22	190
		-2.9	142	295
4	VA120	-5.9	13	181
		-2.9	140	275
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1A.7: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1A.8: Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	198
		-2.9	368
2	PB3	-5.9	34
		-2.9	219
3	VA30	-5.9	47
		-2.9	214
4	VA120	-5.9	28
		-2.9	167
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

9.2.1B Single Link Performance - QPSK, Fixed Reference Channel (FRC) H-Set 4/5

9.2.1B.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 11 and 12.

9.2.1B.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 4/5 specified in Annex C.8.1.4 and C.8.1.5 respectively, with the addition of the relevant parameters in Table 9.2.1B.1 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Tables 9.2.1B.2 and 9.2.1B.3.

Table 9.2.1B.1: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1B.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	72	340
		-3	N/A	439
2	PB3	-6	24	186
		-3	142	299
3	VA30	-6	19	183
		-3	148	306
4	VA120	-6	11	170
		-3	144	284
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.1B.3: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	98	464
		-3	N/A	635
2	PB3	-6	35	272
		-3	207	431
3	VA30	-6	33	285
		-3	213	443
4	VA120	-6	20	272
		-3	210	413
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5				

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.3.

9.2.1B.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1B.4 Method of test

9.2.1B.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 the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1B.1 and levels according to tables 9.2.1B.4 to 9.2.1B.6 as appropriate. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 5: The information bit payload block is 3202 bits long. Hence the PRBSequence must be at least 3202 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1B.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1B.4 to 9.2.1B.6 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.3 and F.6.3.5.2.4.

9.2.1B.5 Test Requirements

Tables 9.2.1B.4 to 9.2.1B.6 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1B.4: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1B.5: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	72	340
		-2.9	N/A	439
2	PB3	-5.9	24	186
		-2.9	142	299
3	VA30	-5.9	19	183
		-2.9	148	306
4	VA120	-5.9	11	170
		-2.9	144	284
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.1B.6: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	98	464
		-2.9	N/A	635
2	PB3	-5.9	35	272
		-2.9	207	431
3	VA30	-5.9	33	285
		-2.9	213	443
4	VA120	-5.9	20	272
		-2.9	210	413
* NOTES: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5				

9.2.1C Single Link Performance - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6/3

9.2.1C.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 - 10 but not supporting the optional enhanced performance requirements types 1, 2, 3 or 3i.

9.2.1C.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6/3 specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1C.1, 9.2.1C.3, 9.2.1C.5 and 9.2.1C.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Tables 9.2.1C.2, 9.2.1C.4, 9.2.1C.6, and 9.2.1C.8.

Table 9.2.1C.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2,5,6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1C.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1407
		-3	2090

Table 9.2.1C.3: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1C.4: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	887
		-3	1664

Table 9.2.1C.5: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.1C.6: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
2	PB3	-6	23	181
		-3	138	287
3	VA30	-6	22	190
		-3	142	295
4	VA120	-6	13	181
		-3	140	275
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to I+1, i integer)				

Table 9.2.1C.7: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.1C.8: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
2	PB3	-6	34
		-3	219
3	VA30	-6	47
		-3	214
4	VA120	-6	28
		-3	167
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4 and 9.2.1.5.

9.2.1C.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1C.4 Method of test

9.2.1C.4.1 Initial conditions

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

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

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

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to tables 9.2.1C.1, 9.2.1C.3, 9.2.1C.5 or 9.2.1C.7 and levels according to tables 9.2.1C.9 to 9.2.1C.16 respectively. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 3 (16QAM): The information bit payload block is 4664 bits long. Hence the PRBSequence must be at least 4664 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1C.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1C.9 to 9.2.1C.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.2, F.6.3.5.2.5 and F.6.3.5.2.6.

9.2.1C.5 Test Requirements

Tables 9.2.1C.9 to 9.2.1C.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1C.9: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1C.10: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1407
		-2.9	2090

Table 9.2.1C.11: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1C.12: Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	887
		-2.9	1664

Table 9.2.1C.13: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.1C.14: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
2	PB3	-5.9	23	181
		-2.9	138	287
3	VA30	-5.9	22	190
		-2.9	142	295
4	VA120	-5.9	13	181
		-2.9	140	275
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1C.15: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.1C.16: Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
2	PB3	-5.9	34
		-2.9	219
3	VA30	-5.9	47
		-2.9	214
4	VA120	-5.9	28
		-2.9	167
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

9.2.1D Single Link Performance - Enhanced Performance Requirements Type 1 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.1D.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support: the HSDPA UE capability categories 1 to 6 and the optional enhanced performance requirements type 1.

9.2.1D.2 Minimum requirements

The performance requirements for a particular UE belonging to certain HS-DSCH category and supporting the optional enhanced performance requirements type 1 are determined according to the relevant part of Table 9.2.2.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1D.1 and 9.2.1D.3 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1D.2 and 9.2.1D.4.

Table 9.2.1D.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1D.2: Minimum requirement Enhanced requirement type 1 QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-12	N/A	247
		-9	N/A	379
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	195
		-6	156	316
		-3	263	N/A
3	VA30	-9	N/A	212
		-6	171	329
		-3	273	N/A
4	VA120	-9	N/A	191
		-6	168	293
		-3	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1D.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1D.4: Minimum requirement Enhanced requirement type 1 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	312
		-6	487
2	PB3	-6	275
		-3	408
3	VA30	-6	296
		-3	430
4	VA120	-6	271
		-3	392
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1 and 9.2.1.2.

9.2.1D.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1D.4 Method of test

9.2.1D.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1D.1 or 9.2.1D.3 and the levels according to tables 9.2.1D.5 to 9.2.1D.8 as appropriate. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBSequence must be at least 4664 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number i is continued exactly after 6 TTIs.

6) Setup the fading simulators with fading conditions as described in table D.2.2.1.A and for UEs that support receive diversity as also described in clause D.2.5.

9.2.1D.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1D.5 to 9.2.1D.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1A and F.6.3.5.2.2A.

9.2.1D.5 Test Requirements

Tables 9.2.1D.5 to 9.2.1D.8 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1D.5: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1D.6: Test requirement enhanced requirement type 1 QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	247
		-8.9	N/A	379
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	195
		-5.9	156	316
		-2.9	263	N/A
3	VA30	-8.9	N/A	212
		-5.9	171	329
		-2.9	273	N/A
4	VA120	-8.9	N/A	191
		-5.9	168	293
		-2.9	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1D.7: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1D.8: Test requirement enhanced requirement type 1 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-8.9	312
		-5.9	487
2	PB3	-5.9	275
		-2.9	408
3	VA30	-5.9	296
		-2.9	430
4	VA120	-5.9	271
		-2.9	392
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

9.2.1E Single Link Performance - Enhanced Performance Requirements Type 1- QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6/3

9.2.1E.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7 - 10; and the optional enhanced performance requirements type 1.

9.2.1E.2 Minimum requirements

The performance requirements for a particular UE belonging to certain HS-DSCH category and supporting the optional enhanced performance requirements type 1 are determined according to the relevant part of Table 9.2.2.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6/3 specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1E.1, 9.2.1E.3, 9.2.1E.5 and 9.2.1E.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1E.2, 9.2.1E.4, 9.2.1E.6 and 9.2.1E.8.

Table 9.2.1E.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2,5,6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1E.2: Minimum requirement Enhanced requirements type 1 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	672
		-9	1305

Table 9.2.1E.3: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1E.4: Minimum requirement Enhanced requirements type 1 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-9	912
		-6	1730

Table 9.2.1E.5: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.1E.6: Minimum requirement Enhanced requirement type 1 QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
2	PB3	-9	N/A	195
		-6	156	316
		-3	263	N/A
3	VA30	-9	N/A	212
		-6	171	329
		-3	273	N/A
4	VA120	-9	N/A	191
		-6	168	293
		-3	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1E.7: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.1E.8: Minimum requirement Enhanced requirement type 1 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
2	PB3	-6	275
		-3	408
3	VA30	-6	296
		-3	430
4	VA120	-6	271
		-3	392
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1E.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1E.4 Method of test

9.2.1E.4.1 Initial conditions

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

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

1) The SS (node B emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.
2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.
3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1E.1, 9.2.1E.3 or 9.2.1E.5 and levels according to tables 9.2.1E.9 to 9.2.1E.16 as appropriate. The configuration of the downlink channels is defined in table E.5.1.
4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 3 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBSequence must be at least 4664 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]
5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number i is continued exactly after 6 TTIs.
6) Setup the fading simulators with fading conditions as described in table D.2.2.1.A and for UEs that support receive diversity as also described in clause D.2.5.

9.2.1E.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.
2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1E.9 to 9.2.1E.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1A, F.6.3.5.2.2A, F.6.3.5.2.5A and F.6.3.5.2.6A.

9.2.1E.5 Test Requirements

Tables 9.2.1E.9 to 9.2.1E.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1E.9: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1E.10: Test requirement enhanced requirements type 1 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-11.9	672
		-8.9	1305

Table 9.2.1E.11: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1E.12: Test requirement enhanced requirements type 1 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	912
		-5.9	1730

Table 9.2.1E.13: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.1E.14: Test requirement enhanced requirement type 1 QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
2	PB3	-8.9	N/A	195
		-5.9	156	316
		-2.9	263	N/A
3	VA30	-8.9	N/A	212
		-5.9	171	329
		-2.9	273	N/A
4	VA120	-8.9	N/A	191
		-5.9	168	293
		-2.9	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.1E.15: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.1E.16: Test requirement enhanced requirement type 1 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
2	PB3	-5.9	275
		-2.9	408
3	VA30	-5.9	296
		-2.9	430
4	VA120	-5.9	271
		-2.9	392
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

9.2.1F Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6/3

9.2.1F.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7 - 10 and the optional enhanced performance requirements type 2 or type 3 or type 3i.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 13-14.

9.2.1F.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 2 are determined according to the relevant part of Table 9.2.3.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6/3 specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1F.1, 9.2.1F.3 and 9.2.1F.5 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1F.2, 9.2.1F.4 and 9.2.1F.6.

Table 9.2.1F.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1F.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1494
		-3	2153
2	PB3	-6	1038
		-3	1744
3	VA30	-6	1142
		-3	1782
4	VA120	-6	909
		-3	1467

Table 9.2.1F.3: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1F.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	991
		-3	1808
2	PB3	-6	465
		-3	1370
3	VA30	-6	587
		-3	1488
4	VA120	-6	386
		-3	1291

Table 9.2.1F.5: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1F.6: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	65	N/A
		-3	N/A	N/A
2	PB3	-6	23	N/A
		-3	138	N/A
3	VA30	-6	22	N/A
		-3	142	N/A
4	VA120	-6	13	N/A
		-3	140	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 2) For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6.				

NOTE: Table 9.2.1F.6 is based on core requirements for minimum requirement as explained in Table 9.2.3.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1F.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1F.4 Method of test

9.2.1F.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.10 for UEs that do not support receive diversity and for UEs supporting Type 3 or 3i, or figure A.21 for non-Type3 or 3i UEs that support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1F.1, 9.2.1F.3 or 9.2.1F.5 and levels according to tables 9.2.1F.7 to 9.2.1F.12 as appropriate. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1F.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1F.7 to 9.2.1F.12 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.5B and F.6.3.5.2.6B.

9.2.1F.5 Test Requirements

Tables 9.2.1F.7 to 9.2.1F.12 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1F.7: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1F.8: Test requirement enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1494
		-2.9	2153
2	PB3	-5.9	1038
		-2.9	1744
3	VA30	-5.9	1142
		-2.9	1782
4	VA120	-5.9	909
		-2.9	1467

Table 9.2.1F.9: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1F.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	991
		-2.9	1808
2	PB3	-5.9	465
		-2.9	1370
3	VA30	-5.9	587
		-2.9	1488
4	VA120	-5.9	386
		-2.9	1291

Table 9.2.1F.11: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1F.12: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	N/A
		-2.9	N/A	N/A
2	PB3	-5.9	23	N/A
		-2.9	138	N/A
3	VA30	-5.9	22	N/A
		-2.9	142	N/A
4	VA120	-5.9	13	N/A
		-2.9	140	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 2) For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6.				

9.2.1FA Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6A/3A

9.2.1FA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 21 - 24 but not supporting Dual band operation.

9.2.1FA.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 21- 24 are determined according to the relevant part of Table 9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6A/3A specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1FA.1, 9.2.1FA.3 and 9.2.1FA.5 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1FA.2, 9.2.1FA.4 and 9.2.1FA.6.

Table 9.2.1FA.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FA.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	1494
		-3	2153
2	PB3	-6	1038
		-3	1744
3	VA30	-6	1142
		-3	1782
4	VA120	-6	909
		-3	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1FA.3: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FA.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	991
		-3	1808
2	PB3	-6	465
		-3	1370
3	VA30	-6	587
		-3	1488
4	VA120	-6	386
		-3	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1FA.5: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FA.6: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	65	N/A
		-3	N/A	N/A
2	PB3	-6	23	N/A
		-3	138	N/A
3	VA30	-6	22	N/A
		-3	142	N/A
4	VA120	-6	13	N/A
		-3	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0) *NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

NOTE: Table 9.2.1FA.6 is based on core requirements for minimum requirement as explained in Table 9.2.3C.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1FA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1FA.4 Method of test

9.2.1FA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.35 for UEs that do not support receive diversity and for UEs supporting Type 3 or 3i, or figure A.37 for non-Type3 or 3i UEs that support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1FA.1, 9.2.1FA.3 or 9.2.1FA.5 and levels according to tables 9.2.1FA.7 to 9.2.1FA.12 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell.. The configuration of the downlink channels is defined in table E.5.1 for the serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each of the serving cells as described in table D.2.2.1.A.

9.2.1FA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1FA.7 to 9.2.1FA.12 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.5B and F.6.3.5.2.6B. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1FA.5 Test Requirements

Tables 9.2.1FA.7 to 9.2.1FA.12 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1FA.7: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FA.8: Test requirement enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1494
		-2.9	2153
2	PB3	-5.9	1038
		-2.9	1744
3	VA30	-5.9	1142
		-2.9	1782
4	VA120	-5.9	909
		-2.9	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FA.9: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FA.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	991
		-2.9	1808
2	PB3	-5.9	465
		-2.9	1370
3	VA30	-5.9	587
		-2.9	1488
4	VA120	-5.9	386
		-2.9	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FA.11: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FA.12: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	N/A
		-2.9	N/A	N/A
2	PB3	-5.9	23	N/A
		-2.9	138	N/A
3	VA30	-5.9	22	N/A
		-2.9	142	N/A
4	VA120	-5.9	13	N/A
		-2.9	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0). The throughput on each cell should be Reference value R times 3. *NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

9.2.1FB Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6A/3A for DB-DC-HSDPA

9.2.1FB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DB-DC-HSDPA and HSDPA UE capability categories 21-24.

9.2.1FB.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 21- 24 are determined according to the relevant part of Table 9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6A/3A specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1FB.1, 9.2.1FB.3 and 9.2.1FB.5 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1FB.2, 9.2.1FB.4 and 9.2.1FB.6.

Table 9.2.1FB.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FB.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	1494
		-3	2153
2	PB3	-6	1038
		-3	1744
3	VA30	-6	1142
		-3	1782
4	VA120	-6	909
		-3	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1FB.3: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FB.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	991
		-3	1808
2	PB3	-6	465
		-3	1370
3	VA30	-6	587
		-3	1488
4	VA120	-6	386
		-3	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1FB.5: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FB.6: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	65	N/A
		-3	N/A	N/A
2	PB3	-6	23	N/A
		-3	138	N/A
3	VA30	-6	22	N/A
		-3	142	N/A
4	VA120	-6	13	N/A
		-3	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0)				
*NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

NOTE: Table 9.2.1FB.6 is based on core requirements for minimum requirement as explained in Table 9.2.3C.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1FB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1FB.4 Method of test

9.2.1FB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.35 for UEs that do not support receive diversity and for UEs supporting Type 3 or 3i, or figure A.37 for non-Type3 or 3i UEs that support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0. 3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1FB.1, 9.2.1FB.3 or 9.2.1FB.5 and levels according to tables 9.2.1FB.7 to 9.2.1FB.12 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.1 for the serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each of the serving cells as described in table D.2.2.1.A.

9.2.1FB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1FB.7 to 9.2.1FB.12 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.5B and F.6.3.5.2.6B. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1FB.5 Test Requirements

Tables 9.2.1FB.7 to 9.2.1FB.12 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1FB.7: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FB.8: Test requirement enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1494
		-2.9	2153
2	PB3	-5.9	1038
		-2.9	1744
3	VA30	-5.9	1142
		-2.9	1782
4	VA120	-5.9	909
		-2.9	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FB.9: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FB.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	991
		-2.9	1808
2	PB3	-5.9	465
		-2.9	1370
3	VA30	-5.9	587
		-2.9	1488
4	VA120	-5.9	386
		-2.9	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FB.11: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FB.12: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	N/A
		-2.9	N/A	N/A
2	PB3	-5.9	23	N/A
		-2.9	138	N/A
3	VA30	-5.9	22	N/A
		-2.9	142	N/A
4	VA120	-5.9	13	N/A
		-2.9	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0). The throughput on each cell should be Reference value R times 3. *NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

9.2.1FC Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6B/3B

9.2.1FC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 29.

9.2.1FC.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 29 are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6B/3B specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1FC.1, 9.2.1FC.3 and 9.2.1FC.5 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1FC.2, 9.2.1FC.4 and 9.2.1FC.6.

Table 9.2.1FC.1: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FC.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	1494
		-3	2153
2	PB3	-6	1038
		-3	1744
3	VA30	-6	1142
		-3	1782
4	VA120	-6	909
		-3	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0)			

Table 9.2.1FC.3: Test Parameters for Testing 16QAM FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FC.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	991
		-3	1808
2	PB3	-6	465
		-3	1370
3	VA30	-6	587
		-3	1488
4	VA120	-6	386
		-3	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0)			

Table 9.2.1FC.5: Test Parameters for Testing QPSK FRCs H-Set 3B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FC.6: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 3B

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	65	N/A
		-3	N/A	N/A
2	PB3	-6	23	N/A
		-3	138	N/A
3	VA30	-6	22	N/A
		-3	142	N/A
4	VA120	-6	13	N/A
		-3	140	N/A
*NOTE 1: For Fixed Reference Channel (FRC) H-Set 3B the reference values for R should be scaled (multiplied by 9) *NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6B.				

NOTE: Table 9.2.1FC.6 is based on core requirements for minimum requirement as explained in Table 9.2.3C.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.4, and 9.2.1.5.

9.2.1FC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1FC.4 Method of test

9.2.1FC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.35 for UEs that do not support receive diversity and for UEs supporting Type 3 or 3i, or figure A.37 for non-Type3 or 3i UEs that support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1FC.1, 9.2.1FC.3 or 9.2.1FC.5 and levels according to tables 9.2.1FC.7 to 9.2.1FC.12 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for the serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each of the serving cells as described in table D.2.2.1.A.

9.2.1FC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1FC.7 to 9.2.1FC.12 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.5B and F.6.3.5.2.6B. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1FC.5 Test Requirements

Tables 9.2.1FC.7 to 9.2.1FC.12 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1FC.7: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FC.8: Test requirement enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1494
		-2.9	2153
2	PB3	-5.9	1038
		-2.9	1744
3	VA30	-5.9	1142
		-2.9	1782
4	VA120	-5.9	909
		-2.9	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FC.9: Test Parameters for Testing 16QAM FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FC.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	991
		-2.9	1808
2	PB3	-5.9	465
		-2.9	1370
3	VA30	-5.9	587
		-2.9	1488
4	VA120	-5.9	386
		-2.9	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FC.11: Test Parameters for Testing QPSK FRCs H-Set 3B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FC.12: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3B

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	N/A
		-2.9	N/A	N/A
2	PB3	-5.9	23	N/A
		-2.9	138	N/A
3	VA30	-5.9	22	N/A
		-2.9	142	N/A
4	VA120	-5.9	13	N/A
		-2.9	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3B the reference values for R should be scaled (multiplied by 9.0). The throughput on each cell should be Reference value R times 9.				

9.2.1FD Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6C/3C

9.2.1FD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 31.

9.2.1FD.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 31 are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6C/3C specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1FD.1, 9.2.1FD.3 and 9.2.1FD.5 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1FD.2, 9.2.1FD.4 and 9.2.1FD.6.

Table 9.2.1FD.1: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FD.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1494
		-3	2153
2	PB3	-6	1038
		-3	1744
3	VA30	-6	1142
		-3	1782
4	VA120	-6	909
		-3	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0)			

Table 9.2.1FD.3: Test Parameters for Testing 16QAM FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FD.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	991
		-3	1808
2	PB3	-6	465
		-3	1370
3	VA30	-6	587
		-3	1488
4	VA120	-6	386
		-3	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0)			

Table 9.2.1FD.5: Test Parameters for Testing QPSK FRCs H-Set 3C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1FD.6: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 3C

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	65	N/A
		-3	N/A	N/A
2	PB3	-6	23	N/A
		-3	138	N/A
3	VA30	-6	22	N/A
		-3	142	N/A
4	VA120	-6	13	N/A
		-3	140	N/A
*NOTE 1: For Fixed Reference Channel (FRC) H-Set 3C the reference values for R should be scaled (multiplied by 12). *NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6C.				

NOTE: Table 9.2.1FD.6 is based on core requirements for minimum requirement as explained in Table 9.2.3C.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.4, and 9.2.1.5.

9.2.1FD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1FD.4 Method of test

9.2.1FD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.35 for UEs that do not support receive diversity and for UEs supporting Type 3 or 3i, or figure A.37 for non-Type3 or 3i UEs that support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1FD.1, 9.2.1FD.3 or 9.2.1FD.5 and levels according to tables 9.2.1FD.7 to 9.2.1FD.12 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink

channels is defined in table E.5.1 for the serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each of the serving cells as described in table D.2.2.1.A.

9.2.1FD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1FD.7 to 9.2.1FD.12 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1, F.6.3.5.2.5B and F.6.3.5.2.6C. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1FD.5 Test Requirements

Tables 9.2.1FD.7 to 9.2.1FD.12 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1FD.7: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FD.8: Test requirement enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-5.9	1494
		-2.9	2153
2	PB3	-5.9	1038
		-2.9	1744
3	VA30	-5.9	1142
		-2.9	1782
4	VA120	-5.9	909
		-2.9	1467
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FD.9: Test Parameters for Testing 16QAM FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FD.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	991
		-2.9	1808
2	PB3	-5.9	465
		-2.9	1370
3	VA30	-5.9	587
		-2.9	1488
4	VA120	-5.9	386
		-2.9	1291
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1FD.11: Test Parameters for Testing QPSK FRCs H-Set 3C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1FD.12: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3C

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	65	N/A
		-2.9	N/A	N/A
2	PB3	-5.9	23	N/A
		-2.9	138	N/A
3	VA30	-5.9	22	N/A
		-2.9	142	N/A
4	VA120	-5.9	13	N/A
		-2.9	140	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, For Fixed Reference Channel (FRC) H-Set 3C the reference values for R should be scaled (multiplied by 12.0). The throughput on each cell should be Reference value R times 12.				

9.2.1G Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6/3

9.2.1G.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7, 8, 9, 10, 13 or 14, and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 - 18.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7, 8, 9, 10, 13 or 14, and the optional enhanced performance requirements type 3i.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.2.1G.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3A.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6/3 specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1G.1, 9.2.1G.4 and 9.2.1G.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1G.2, 9.2.1G.3, 9.2.1G.5, 9.2.1G.6, and 9.2.1G.8.

Table 9.2.1G.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{0,2,5,6}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1G.2: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	1554
		-6	2495
2	PB3	-9	1190
		-6	2098
3	VA30	-9	1229
		-6	2013
4	VA120	-9	1060
		-6	1674

Table 9.2.1G.3: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	1248
		-3	2044

Table 9.2.1G.4: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{6,2,1,5}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1G.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1979
		-3	3032
2	PB3	-6	1619
		-3	2464
3	VA30	-6	1710
		-3	2490
4	VA120	-6	1437
		-3	2148

Table 9.2.1G.6: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	779
		-3	1688

Table 9.2.1G.7: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1G.8: Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-12	N/A	N/A
		-9	N/A	N/A
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	N/A
		-6	156	N/A
		-3	263	N/A
3	VA30	-9	N/A	N/A
		-6	171	N/A
		-3	273	N/A
4	VA120	-9	N/A	N/A
		-6	168	N/A
		-3	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

NOTE: Table 9.2.1G.8 is based on core requirements for enhanced requirements type 1 as explained in Table 9.2.3A.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1G.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1G.4 Method of test

9.2.1G.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1G.1, 9.2.1G.4 and 9.2.1G.7 and levels according to tables 9.2.1G.9 to 9.2.1G.16 as appropriate. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6.

9.2.1G.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1G.9 to 9.2.1G.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.1A, F.6.3.5.2.5C and F.6.3.5.2.6C.

9.2.1G.5 Test Requirements

Tables 9.2.1G.9 to 9.2.1G.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1G.9: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1G.10: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	1554
		-5.9	2495
2	PB3	-8.9	1190
		-5.9	2098
3	VA30	-8.9	1229
		-5.9	2013
4	VA120	-8.9	1060
		-5.9	1674

Table 9.2.1G.11: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	1248
		-2.9	2044

Table 9.2.1G.12: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1G.13: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1979
		-2.9	3032
2	PB3	-5.9	1619
		-2.9	2464
3	VA30	-5.9	1710
		-2.9	2490
4	VA120	-5.9	1437
		-2.9	2148

Table 9.2.1G.14: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	779
		-2.9	1688

Table 9.2.1G.15: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1G.16: Test requirement enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	N/A
		-8.9	N/A	N/A
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	N/A
		-5.9	156	N/A
		-2.9	263	N/A
3	VA30	-8.9	N/A	N/A
		-5.9	171	N/A
		-2.9	273	N/A
4	VA120	-8.9	N/A	N/A
		-5.9	168	N/A
		-2.9	263	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

9.2.1GA Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6A/3A

9.2.1GA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 21-24 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 25-28 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

9.2.1GA.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 21 -28 and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6A/3A specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1GA.1, 9.2.1GA.4 and 9.2.1GA.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1GA. 2, 9.2.1GA.3, 9.2.1GA.5, 9.2.1GA.6, and 9.2.1GA.8.

Table 9.2.1GA.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{0,2,5,6}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GA.2: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	1554
		-6	2495
2	PB3	-9	1190
		-6	2098
3	VA30	-9	1229
		-6	2013
4	VA120	-9	1060
		-6	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GA.3: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	1248
		-3	2044
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 2) For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GA.4: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{6,2,1,5}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GA.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1979
		-3	3032
2	PB3	-6	1619
		-3	2464
3	VA30	-6	1710
		-3	2490
4	VA120	-6	1437
		-3	2148
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GA.6: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	779
		-3	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GA.7: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1GA.8: Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	N/A	N/A
		-9	N/A	N/A
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	N/A
		-6	156	N/A
		-3	263	N/A
3	VA30	-9	N/A	N/A
		-6	171	N/A
		-3	273	N/A
4	VA120	-9	N/A	N/A
		-6	168	N/A
		-3	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0) *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

NOTE: Table 9.2.1GA.8 is based on core requirements for enhanced requirements type 1 as explained in Table 9.2.3D.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1GA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1GA.4 Method of test

9.2.1GA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call with according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1GA.1, 9.2.1GA.4 and 9.2.1GA.7 and levels according to tables 9.2.1GA.9 to 9.2.1GA.16 as appropriate for both serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for the serving HS-DSCH cell. and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6 on each of the serving cells..

9.2.1GA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1GA.9 to 9.2.1GA.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.5C and F.6.3.5.2.6C. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1GA.5 Test Requirements

Tables 9.2.1GA.9 to 9.2.1GA.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to AnnexF.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Table 9.2.1GA.9: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GA.10: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	1554
		-5.9	2495
2	PB3	-8.9	1190
		-5.9	2098
3	VA30	-8.9	1229
		-5.9	2013
4	VA120	-8.9	1060
		-5.9	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0) The throughput on each cell should be Reference value R.			

Table 9.2.1GA.11: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	1248
		-2.9	2044
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GA.12: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GA.13: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1979
		-2.9	3032
2	PB3	-5.9	1619
		-2.9	2464
3	VA30	-5.9	1710
		-2.9	2490
4	VA120	-5.9	1437
		-2.9	2148
*Note1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GA.14: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	779
		-2.9	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GA.15: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1GA.16: Test requirement enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	N/A
		-8.9	N/A	N/A
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	N/A
		-5.9	156	N/A
		-2.9	263	N/A
3	VA30	-8.9	N/A	N/A
		-5.9	171	N/A
		-2.9	273	N/A
4	VA120	-8.9	N/A	N/A
		-5.9	168	N/A
		-2.9	263	N/A

*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1.
*NOTE 2: For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0). The throughput on each cell should be Reference value R times 3.
*NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.

9.2.1GB Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6A/3A for DB-DC-HSDPA

9.2.1GB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: DB-DC-HSDPA and HSDPA UE capability categories 21-28 and support the optional enhanced performance requirements type 3 or 3i.

DB-DC-HSDPA is designed to operate in configurations specified in clause 4.2.

9.2.1GB.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 21 -28 and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6A/3A specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1GB.1, 9.2.1GB.4 and 9.2.1GB.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1GB.2, 9.2.1GB.3, 9.2.1GB.5, 9.2.1GB.6, and 9.2.1GB.8.

Table 9.2.1GB.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{0,2,5,6}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GB.2: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	1554
		-6	2495
2	PB3	-9	1190
		-6	2098
3	VA30	-9	1229
		-6	2013
4	VA120	-9	1060
		-6	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GB.3: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	1248
		-3	2044
* NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 * NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GB.4: Test Parameters for Testing 16QAM FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{6,2,1,5}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GB.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1979
		-3	3032
2	PB3	-6	1619
		-3	2464
3	VA30	-6	1710
		-3	2490
4	VA120	-6	1437
		-3	2148
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GB.6: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	779
		-3	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0)			

Table 9.2.1GB.7: Test Parameters for Testing QPSK FRCs H-Set 3A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1GB.8: Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	N/A	N/A
		-9	N/A	N/A
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	N/A
		-6	156	N/A
		-3	263	N/A
3	VA30	-9	N/A	N/A
		-6	171	N/A
		-3	273	N/A
4	VA120	-9	N/A	N/A
		-6	168	N/A
		-3	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0) *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

NOTE: Table 9.2.1GB.8 is based on core requirements for enhanced requirements type 1 as explained in Table 9.2.3D.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.2, 9.2.1.4, and 9.2.1.5.

9.2.1GB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1GB.4 Method of test

9.2.1GB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call with according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1GB.1, 9.2.1GB.4 and 9.2.1GB.7 and levels according to tables 9.2.1GB.9 to 9.2.1GB.16 as appropriate for both serving HS-DSCH cell and secondary serving HS-DSCH cell. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.1 for the serving HS-DSCH cell. and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6 on each of the serving cells..

9.2.1GB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1GB.9 to 9.2.1GB.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.5C and F.6.3.5.2.6C. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1GB.5 Test Requirements

Tables 9.2.1GB.9 to 9.2.1GB.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to AnnexF.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA120) vary.

Table 9.2.1GB.9: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GB.10: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	1554
		-5.9	2495
2	PB3	-8.9	1190
		-5.9	2098
3	VA30	-8.9	1229
		-5.9	2013
4	VA120	-8.9	1060
		-5.9	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0) The throughput on each cell should be Reference value R.			

Table 9.2.1GB.11: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	1248
		-2.9	2044
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GB.12: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GB.13: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1979
		-2.9	3032
2	PB3	-5.9	1619
		-2.9	2464
3	VA30	-5.9	1710
		-2.9	2490
4	VA120	-5.9	1437
		-2.9	2148
*Note1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GB.14: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	779
		-2.9	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GB.15: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1GB.16: Test requirement enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3A

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	N/A
		-8.9	N/A	N/A
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	N/A
		-5.9	156	N/A
		-2.9	263	N/A
3	VA30	-8.9	N/A	N/A
		-5.9	171	N/A
		-2.9	273	N/A
4	VA120	-8.9	N/A	N/A
		-5.9	168	N/A
		-2.9	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3A the reference values for R should be scaled (multiplied by 6.0). The throughput on each cell should be Reference value R times 3. *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6A.				

9.2.1GC Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6B/3B

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9.2.1GC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 29 or 30 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1GC.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 29-30 and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6B/3B specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1GC.1, 9.2.1GC.4 and 9.2.1GC.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1GC.2, 9.2.1GC.3, 9.2.1GC.5, 9.2.1GC.6, and 9.2.1GC.8.

Table 9.2.1GC.1: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{0,2,5,6}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GC.2: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	1554
		-6	2495
2	PB3	-9	1190
		-6	2098
3	VA30	-9	1229
		-6	2013
4	VA120	-9	1060
		-6	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0).			

Table 9.2.1GC.3: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	1248
		-3	2044
* NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. * NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0).			

Table 9.2.1GC.4: Test Parameters for Testing 16QAM FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{6,2,1,5}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GC.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1979
		-3	3032
2	PB3	-6	1619
		-3	2464
3	VA30	-6	1710
		-3	2490
4	VA120	-6	1437
		-3	2148
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0).			

Table 9.2.1GC.6: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	779
		-3	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0).			

Table 9.2.1GC.7: Test Parameters for Testing QPSK FRCs H-Set 3B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1GC.8: Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3B

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-12	N/A	N/A
		-9	N/A	N/A
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	N/A
		-6	156	N/A
		-3	263	N/A
3	VA30	-9	N/A	N/A
		-6	171	N/A
		-3	273	N/A
4	VA120	-9	N/A	N/A
		-6	168	N/A
		-3	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3B the reference values for R should be scaled (multiplied by 9.0). *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6B.				

NOTE: Table 9.2.1GC.8 is based on core requirements for enhanced requirements type 3 as explained in Table 9.2.3H.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.4, and 9.2.1.5.

9.2.1GC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1GC.4 Method of test

9.2.1GC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure 47 for UEs that support receive diversity or figure 46 for UEs that do not support receive diversity.

2) Set up an HSDPA call with according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1GC.1, 9.2.1GC.4 and 9.2.1GC.7 and levels according to tables 9.2.1GC.9 to 9.2.1GC.16 as appropriate for serving HS-DSCH cell and secondary HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6 on each of the serving cells.

9.2.1GC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on all the cells. For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1GC.9 to 9.2.1GC.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.5C and F.6.3.5.2.6C. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1GC.5 Test Requirements

Tables 9.2.1GC.9 to 9.2.1GC.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance for serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA120) vary.

Table 9.2.1GC.9: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GC.10: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	1554
		-5.9	2495
2	PB3	-8.9	1190
		-5.9	2098
3	VA30	-8.9	1229
		-5.9	2013
4	VA120	-8.9	1060
		-5.9	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0) The throughput on each cell should be Reference value R.			

Table 9.2.1GC.11: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	1248
		-2.9	2044
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GC.12: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GC.13: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1979
		-2.9	3032
2	PB3	-5.9	1619
		-2.9	2464
3	VA30	-5.9	1710
		-2.9	2490
4	VA120	-5.9	1437
		-2.9	2148
*Note1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GC.14: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	779
		-2.9	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GC.15: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1GC.16: Test requirement enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3B

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	N/A
		-8.9	N/A	N/A
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	N/A
		-5.9	156	N/A
		-2.9	263	N/A
3	VA30	-8.9	N/A	N/A
		-5.9	171	N/A
		-2.9	273	N/A
4	VA120	-8.9	N/A	N/A
		-5.9	168	N/A
		-2.9	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3B the reference values for R should be scaled (multiplied by 9.0). The throughput on each cell should be Reference value R times 3. *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6B.				

9.2.1GD Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6C/3C

9.2.1GD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 31 or 32 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1GD.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 31-32 and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-Set 6C/3C specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.1GD.1, 9.2.1GD.4 and 9.2.1GD.7 plus the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1GD.2, 9.2.1GD.3, 9.2.1GD.5, 9.2.1GD.6, and 9.2.1GD.8.

Table 9.2.1GD.1: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{0,2,5,6}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GD.2: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	1554
		-6	2495
2	PB3	-9	1190
		-6	2098
3	VA30	-9	1229
		-6	2013
4	VA120	-9	1060
		-6	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0).			

Table 9.2.1GD.3: Minimum requirement Enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	1248
		-3	2044
* NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. * NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0).			

Table 9.2.1GD.4: Test Parameters for Testing 16QAM FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60				
Redundancy and constellation version coding sequence		{6,2,1,5}				
Maximum number of HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.						

Table 9.2.1GD.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	1979
		-3	3032
2	PB3	-6	1619
		-3	2464
3	VA30	-6	1710
		-3	2490
4	VA120	-6	1437
		-3	2148
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0).			

Table 9.2.1GD.6: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5 dB
5	PB3	-6	779
		-3	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0).			

Table 9.2.1GD.7: Test Parameters for Testing QPSK FRCs H-Set 3C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.					

Table 9.2.1GD.8: Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3C

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	N/A	N/A
		-9	N/A	N/A
		-6	195	N/A
		-3	329	N/A
2	PB3	-9	N/A	N/A
		-6	156	N/A
		-3	263	N/A
3	VA30	-9	N/A	N/A
		-6	171	N/A
		-3	273	N/A
4	VA120	-9	N/A	N/A
		-6	168	N/A
		-3	263	N/A
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 3C the reference values for R should be scaled (multiplied by 12.0). *NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or} / I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6C.				

NOTE: Table 9.2.1GD.8 is based on core requirements for enhanced requirements type 3 as explained in Table 9.2.3H.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.1, 9.2.1.4, and 9.2.1.5.

9.2.1GD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1GD.4 Method of test

9.2.1GD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure 47 for UEs that support receive diversity or figure 46 for UEs that do not support receive diversity.

2) Set up an HSDPA call with according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.1GD.1, 9.2.1GD.4 and 9.2.1GD.7 and levels according to tables 9.2.1GD.9 to 9.2.1GD.16 as appropriate for both serving HS-DSCH cell and secondary HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (16 QAM): The information bit payload block is 9377 bits long. Hence the PRBSequence must be at least 9377 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6 on each of the serving cells.

9.2.1GD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on all the cells. For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1GD.9 to 9.2.1GD.16 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 tables F.6.3.5.2.5C and F.6.3.5.2.6C. Throughput shall be measured per cell and compared to requirements in these tables.

9.2.1GD.5 Test Requirements

Tables 9.2.1GD.9 to 9.2.1GD.16 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to AnnexF.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance for serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA120) vary.

Table 9.2.1GD.9: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GD.10: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 10 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-8.9	1554
		-5.9	2495
2	PB3	-8.9	1190
		-5.9	2098
3	VA30	-8.9	1229
		-5.9	2013
4	VA120	-8.9	1060
		-5.9	1674
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0) The throughput on each cell should be Reference value R.			

Table 9.2.1GD.11: Test requirement enhanced requirement type 3 QPSK at $\hat{I}_{or}/I_{oc}$ = 5 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	1248
		-2.9	2044
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GD.12: Test Parameters for Testing 16QAM FRCs H-Set 6

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)				

Table 9.2.1GD.13: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-5.9	1979
		-2.9	3032
2	PB3	-5.9	1619
		-2.9	2464
3	VA30	-5.9	1710
		-2.9	2490
4	VA120	-5.9	1437
		-2.9	2148
*Note1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GD.14: Test requirement enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 5, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 5.6 dB
5	PB3	-5.9	779
		-2.9	1688
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. *NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1GD.15: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)			

Table 9.2.1GD.16: Test requirement enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 3C

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.6 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
1	PA3	-11.9	N/A	N/A
		-8.9	N/A	N/A
		-5.9	195	N/A
		-2.9	329	N/A
2	PB3	-8.9	N/A	N/A
		-5.9	156	N/A
		-2.9	263	N/A
3	VA30	-8.9	N/A	N/A
		-5.9	171	N/A
		-2.9	273	N/A
4	VA120	-8.9	N/A	N/A
		-5.9	168	N/A
		-2.9	263	N/A

*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1.
*NOTE 2: For Fixed Reference Channel (FRC) H-Set 3C the reference values for R should be scaled (multiplied by 12.0). The throughput on each cell should be Reference value R times 3.
*NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is tested using the Fixed Reference Channel (FRC) H-Set 6C.

9.2.1H Single Link Performance - Enhanced Performance Requirements Type 2 - 64QAM, Fixed Reference Channel (FRC) H-Set 8

9.2.1H.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 13 and 14 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1H.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 13 and 14 and supporting the optional enhanced performance requirements type 2 are determined according to the relevant part of Table 9.2.3.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8 specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1H.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1H.2.

Table 9.2.1H.1: Test Parameters for Testing 64QAM FRCs H-Set 8

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1H.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	4507
		18	5736
NOTE: When determining Ior/Ioc, the contribution from I_{otx} is not included.			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1H.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1H.4 Method of test

9.2.1H.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with exceptions for information elements listed in table 9.2.1H.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1H.1 and levels according to tables 9.2.1H.3 and 9.2.1H.4 as appropriate. The configuration of the downlink channels is defined in table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64 QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Table 9.2.1H.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list -Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark	Version
RAB information for setup list - RAB information for setup - RB mapping info - Downlink RLC logical channel info - Downlink transport channel type - CHOICE DL MAC header type - DL HS-DSCH MAC-ehs Queue Id	 HS-DSCH MAC-ehs 0	 Rel-7 Rel-7
- Logical channel identity	1	
Added or Reconfigured DL TrCH information list - Added or Reconfigured DL TrCH information - CHOICE DL parameters - CHOICE DL MAC header type - Added or reconfigured MAC-ehs reordering queue - MAC-ehs queue to add or reconfigure list - MAC-ehs queue Id - T1 - Treset - MAC-ehs window size	1 TrCHs added HS-DSCH MAC-ehs (one queue) 0 50 Not Present 16	 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Information - HS-SCCH Channelisation Code - HS-SCCH Channelisation Code - CHOICE mode - Downlink 64QAM configured	 FDD 2 3 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

9.2.1H.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc,1 for all relevant H-sets in tables 9.2.1H.3 and 9.2.1H.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7.

9.2.1H.5 Test Requirements

Tables 9.2.1H.3 and 9.2.1H.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1H.3: Test Parameters for Testing 64QAM FRCs H-Set 8

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1H.4: Test requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB) ***	**T-put R (kbps) HS-PDSCH** E_c/I_{or} **= -1.9 dB**
1	PA3	15.6	4507
		18.6	5736
* NOTE: When determining Ior/Ioc, the contribution from I_{otx} is not included.			

9.2.1HA Single Link Performance - Enhanced Performance Requirements Type 2 - 64QAM, Fixed Reference Channel (FRC) H-Set 8 A

9.2.1HA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 23-24 but not the optional enhanced performance requirements Type 3 or Type 3i and not supporting Dual band operation.

9.2.1HA.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 23 -24 are determined according to the relevant part of Table9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8A specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1HA.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1HA.2.

Table 9.2.1HA.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1HA.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	4507
		18	5736
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1HA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1HA.4 Method of test

9.2.1HA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1HA.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1HA.1 and levels according to tables 9.2.1HA.3 and 9.2.1HA.4 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell. and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64 QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Table 9.2.1HA.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list -Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1HA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc,1 for all relevant H-sets in tables 9.2.1HA.3 and 9.2.1HA.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7 Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7.

9.2.1HA.5 Test Requirements

Tables 9.2.1HA.3 and 9.2.1HA.4 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied to both serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1HAA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1HA.4: Test requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	4507
		18.6	5736

*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included.
*NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8
*NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R

9.2.1HB Single Link Performance - Enhanced Performance Requirements Type 2 - 64QAM, Fixed Reference Channel (FRC) H-Set 8 A for DB-DC-HSDPA

9.2.1HB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DB-DC-HSDPA and HSDPA UE capability categories 23-24 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1HB.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH categories 23 -24 are determined according to the relevant part of Table9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8A specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1HB.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1HB.2.

Table 9.2.1HB.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1HB.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	4507
		18	5736
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1HB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1HB.4 Method of test

9.2.1HB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1HB.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1HB.1 and levels according to tables 9.2.1HB.3 and 9.2.1HB.4 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cell. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell. and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64 QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Table 9.2.1HB.2A: Specific Message Contents for Testing 64QAM FRCs H-Set 8A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list -Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1HB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc,1 for all relevant H-sets in tables 9.2.1HB.3 and 9.2.1HB.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7 Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7.

9.2.1HB.5 Test Requirements

Tables 9.2.1HB.3 and 9.2.1HB.4 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied to both serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1HBA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1HB.4: Test requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	4507
		18.6	5736
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R			

9.2.1HC Single Link Performance - Enhanced Performance Requirements Type 2 - 64QAM, Fixed Reference Channel (FRC) H-Set 8B

9.2.1HC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 29 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1HC.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 29 are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-Set 8B specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1HC.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1HC.2.

Table 9.2.1HC.1: Test Parameters for Testing 64QAM FRCs H-Set 8B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1HC.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	4507
		18	5736
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 2) For Fixed Reference Channel (FRC) H-Set 8B the reference values for R should be scaled (multiplied by 3) 3) When determining Ior/Ioc, the contribution from I_{otx} is not included.			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1HC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1HC.4 Method of test

9.2.1HC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.46.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1HC.1 and levels according to tables 9.2.1HC.3 and 9.2.1HC.4 as appropriate on serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell. For secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64 QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Table 9.2.1HC.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8B

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1HC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on serving cell and on all secondary serving cells. For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1HC.3 and 9.2.1HC.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7 Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7.

9.2.1HC.5 Test Requirements

Tables 9.2.1HC.3 and 9.2.1HC.4 define the primary level settings including test tolerance for all relevant throughput tests to be applied to the serving and secondary serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied to serving cell and secondary serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1HC.3: Test Parameters for Testing 64QAM FRCs H-Set 8B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1HC.4: Test requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	4507
		18.6	5736

*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included.
*NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8
*NOTE 3: For Fixed Reference Channel (FRC) H-Set 8B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R

9.2.1HD Single Link Performance - Enhanced Performance Requirements Type 2 - 64QAM, Fixed Reference Channel (FRC) H-Set 8C

9.2.1HD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 31 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1HD.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 31 are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-Set 8C specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1HD.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1HD.2.

Table 9.2.1HD.1: Test Parameters for Testing 64QAM FRCs H-Set 8C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1HD.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ **(dB) ***	**T-put R (kbps) HS-PDSCH** E_c / I_{or} **= -2 dB**
1	PA3	15	4507
		18	5736
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8C the reference values for R should be scaled (multiplied by 4)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1HD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1HD.4 Method of test

9.2.1HD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.46.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1HD.1 and levels according to tables 9.2.1HD.3 and 9.2.1HD.4 as appropriate on serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell. For secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64 QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Table 9.2.1HD.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8C

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version

Downlink information for per radio links list
 - Downlink information for each radio links
   - Downlink DPCH info for each RL
    - DL channelisation code
     - Code number
	
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Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version

Downlink information per radio link list
 - Downlink information for each radio link
   - Downlink DPCH info for each RL
    - DL channelisation code
     - Code number
	
	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7

Downlink information per radio link list
 - Downlink information for each radio link
   - Downlink DPCH info for each RL
    - DL channelisation code
     - Code number
	
	7	

Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1HD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1HD.3 and 9.2.1HD.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7.

9.2.1HD.5 Test Requirements

Tables 9.2.1HD.3 and 9.2.1HD.4 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied to serving and secondary serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1HD.3: Test Parameters for Testing 64QAM FRCs H-Set 8C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1HD.4: Test requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB) ***	**T-put R (kbps) HS-PDSCH** E_c/I_{or} **= -1.9 dB**
1	PA3	15.6	4507
		18.6	5736
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8C the reference values for R should be scaled (multiplied by 4). The throughput on each cell should be Reference value R			

9.2.1I Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8

9.2.1I.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 7 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 or 14, and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 17 or 18.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 or 14, and the optional enhanced performance requirements type 3i.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.2.1I.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3A.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8 specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1I.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1I.2.

Table 9.2.1I.1: Test Parameters for Testing 64QAM FRCs H-Set 8

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1I.2: Minimum requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	6412
		18	7638
NOTE: When determining Ior/Ioc, the contribution from I_{otx} is not included.			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1I.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1I.4 Method of test

9.2.1I.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with exceptions for information elements listed in table 9.2.1I.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1I.1 and levels according to tables 9.2.1I.3 and 9.2.1I.14 as appropriate. The configuration of the downlink channels is defined in table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6.

Table 9.2.1I.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark	Version
RAB information for setup list - RAB information for setup - RB mapping info - Downlink RLC logical channel info - Downlink transport channel type - CHOICE DL MAC header type - DL HS-DSCH MAC-ehs Queue Id - Logical channel identity	 HS-DSCH MAC-ehs 0 1	 Rel-7 Rel-7
Added or Reconfigured DL TrCH information list - Added or Reconfigured DL TrCH information - CHOICE DL parameters - CHOICE DL MAC header type - Added or reconfigured MAC-ehs reordering queue - MAC-ehs queue to add or reconfigure list - MAC-ehs queue Id - T1 - Treset - MAC-ehs window size	1 TrCHs added HS-DSCH MAC-ehs (one queue) 0 50 Not Present 16	 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7 Rel-7
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Information - HS-SCCH Channelisation Code - HS-SCCH Channelisation Code - CHOICE mode - Downlink 64QAM configured	 FDD 2 3 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

9.2.1I.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1I.3 and 9.2.1I.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7A.

9.2.1I.5 Test Requirements

Tables 9.2.1I.3 and 9.2.1I.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1I.3: Test Parameters for Testing 64QAM FRCs H-Set 8

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1I.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	6412
		18.6	7638
* NOTE: When determining Ior/Ioc, the contribution from I_{otx} is not included.			

9.2.1IA Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8A

9.2.1IA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 23-24 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 27-28 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

9.2.1IA.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8A specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1IA.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1IA.2.

Table 9.2.1IA.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1IA.2: Minimum requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	6412
		18	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1IA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1IA.4 Method of test

9.2.1IA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1IA.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1IA.1 and levels according to tables 9.2.1IA.3 and 9.2.1IA.14 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6.

Table 9.2.1IA.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1IA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells for secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1IA.3 and 9.2.1IA.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7A. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7A.

9.2.1IA.5 Test Requirements

Tables 9.2.1IA.3 and 9.2.1IA.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1IA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1IA.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	6412
		18.6	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R *NOTE 4: should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1IB Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8A for DB-DC-HSDPA

9.2.1IB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: DB-DC-HSDPA and HSDPA UE capability categories 23, 24, 27 or 28 and support the optional enhanced performance requirements type 3 or 3i.

DB-DC-HSDPA is designed to operate in configurations specified in clause 4.2.

9.2.1IB.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8A specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1IB.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1IB.2.

Table 9.2.1IB.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1IB.2: Minimum requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	6412
		18	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1IB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1IB.4 Method of test

9.2.1IB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1IB.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1IB.1 and levels according to tables 9.2.1IB.3 and 9.2.1IB.4 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cell. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.A and clause D.2.6.

Table 9.2.1IB.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1IB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells for secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1IB.3 and 9.2.1IB.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7A. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7A.

9.2.1IB.5 Test Requirements

Tables 9.2.1IB.3 and 9.2.1IB.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1IB.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1IB.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	6412
		18.6	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8A the reference values for R should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1IC Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8B

9.2.1IC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 29 or 30 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1IC.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8B specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1IC.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1IC.2.

Table 9.2.1IC.1: Test Parameters for Testing 64QAM FRCs H-Set 8B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1IC.2: Minimum requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	6412
		18	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8B the reference values for R should be scaled (multiplied by 3.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1IC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1IC.4 Method of test

9.2.1IC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in table 9.2.1IC.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1IC.1 and levels according to tables 9.2.1IC.3 and 9.2.1IC.4 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each cell as described in table D.2.2.1.A and clause D.2.6.

Table 9.2.1IC.2A: Specific Message Contents for Testing 64QAM FRCs H-Set 8B

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1IC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1IC.3 and 9.2.1IC.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7A. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7A.

9.2.1IC.5 Test Requirements

Tables 9.2.1IC.3 and 9.2.1IC.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on each cell. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1IC.3: Test Parameters for Testing 64QAM FRCs H-Set 8B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1IC.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	6412
		18.6	7638

*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included.
*NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8
*NOTE 3: For Fixed Reference Channel (FRC) H-Set 8B the reference values for R should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.

9.2.1ID Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8C

9.2.1ID.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 31 or 32 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1ID.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 8C specified in Annex C.8.1.8, with the addition of the relevant parameters in Table 9.2.1ID.1 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1ID.2.

Table 9.2.1ID.1: Test Parameters for Testing 64QAM FRCs H-Set 8C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
I_{otx} / I_{or}	dB	-24.4
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1ID.2: Minimum requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -2 dB
1	PA3	15	6412
		18	7638
*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included. *NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8 *NOTE 3: For Fixed Reference Channel (FRC) H-Set 8C the reference values for R should be scaled (multiplied by 4.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.1.6.

9.2.1ID.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1ID.4 Method of test

9.2.1ID.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in table 9.2.1ID.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1ID.1 and levels according to tables 9.2.1ID.3 and 9.2.1ID.4 as appropriate on both serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 8 (64QAM): The information bit payload block is 26600 bits long. Hence the PRBSequence must be at least 26600 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions on each cell as described in table D.2.2.1.A and clause D.2.6.

Table 9.2.1ID.2A Specific Message Contents for Testing 64QAM FRCs H-Set 8C

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information - CHOICE mode - Downlink 64QAM configured	 FDD TRUE	 Rel-7
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

9.2.1ID.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1ID.3 and 9.2.1ID.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7A. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7A.

9.2.1ID.5 Test Requirements

Tables 9.2.1ID.3 and 9.2.1ID.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on each cell. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3) vary.

Table 9.2.1ID.3: Test Parameters for Testing 64QAM FRCs H-Set 8C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
I_{otx} / I_{or}	dB	-24.4 (no test tolerance applied)

Table 9.2.1ID.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or} / I_{oc}$ (dB) *	T-put R (kbps) HS-PDSCH E_c / I_{or} = -1.9 dB
1	PA3	15.6	6412
		18.6	7638

*NOTE 1: When determining Ior/Ioc, the contribution from I_{otx} is not included.
*NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 8
*NOTE 3: For Fixed Reference Channel (FRC) H-Set 8C the reference values for R should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.

9.2.1J Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10

9.2.1J.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 9, 10, and the optional enhanced performance requirements type 2 but not the optional enhanced performance requirements Type 3 or Type 3i.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 and 14 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1J.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category are determined according to the relevant part of Table 9.2.3.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10 specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1J.1 and 9.2.1J.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1J.2, and 9.2.1J.4.

Table 9.2.1J.1: Test Parameters for Testing QPSK FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1J.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	1397

Table 9.2.1J.3: Test Parameters for Testing 16QAM FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1J.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	1726

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1J.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1J.4 Method of test

9.2.1J.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with exceptions for information elements listed in table 9.2.1J.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1J.1 or 9.2.1J.3 and levels according to tables 9.2.1J.5 to 9.2.1J.8 as appropriate. The configuration of the downlink channels is defined in table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1J.4A: Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- HS-SCCH Channelisation Code	3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	

9.2.1J.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1J.5 to 9.2.1J.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7B.

9.2.1J.5 Test Requirements

Tables 9.2.1J.5 to 9.2.1J.8 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.8C define the secondary and subsequently ranked level settings including test tolerance.

Table 9.2.1J.5: Test Parameters for Testing QPSK FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1J.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397

Table 9.2.1J.7: Test Parameters for Testing 16QAM FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1J.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 8.6 dB
1	VA3	-1.9	1726

9.2.1JA Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10A

9.2.1JA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 21 - 24 but not the optional enhanced performance requirements Type 3 or Type 3i and not supporting dual band operation.

9.2.1JA.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category are determined according to the relevant part of Table 9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10A specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1JA.1 and 9.2.1JA.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1JA.2, and 9.2.1JA.4.

Table 9.2.1JA.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JA.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

Table 9.2.1JA.3: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JA.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1JA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1JA.4 Method of test

9.2.1JA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1JA.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1JA.1 or 9.2.1JA.3 and levels according to tables 9.2.1JA.5 to 9.2.1JA.8 as appropriate to be applied to both serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1A to be applied on serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1JA.4A: Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list		
- Downlink information for each radio links		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1JA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1JA.5 to 9.2.1JA.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7B Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7B.

9.2.1JA.5 Test Requirements

Tables 9.2.1JA.5 to 9.2.1JA.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance and to be applied to both serving cells.

Table 9.2.1JA.5: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1JA.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1JA.7: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1JA.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1JB Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10A DB-DC-HSDPA

9.2.1JB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: DB-DC-HSDPA and HSDPA UE capability categories 21 - 24 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1JB.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category are determined according to the relevant part of Table 9.2.3C.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10A specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1JB.1 and 9.2.1JB.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1JB.2, and 9.2.1JB.4.

Table 9.2.1JB.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JB.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

Table 9.2.1JB.3: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JB.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1JB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1JB.4 Method of test

9.2.1JB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity. Note; For a transition period of two meeting cycles until RAN#60, figure A.37 does not need to be used.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1JB.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1JB.1 or 9.2.1JB.3 and levels according to tables 9.2.1JB.5 to 9.2.1JB.8 as appropriate to be applied to both serving HS-DSCH cell and secondary serving HS-DSCH cell. The Primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2.The configuration of the downlink channels is defined in table E.5.1A to be applied on serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1JB.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1JB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1JB.5 to 9.2.1JB.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7B Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7B.

9.2.1JB.5 Test Requirements

Tables 9.2.1JB.5 to 9.2.1JB.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance and to be applied to both serving cells.

Table 9.2.1JB.5: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1JB.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1JB.7: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1JB.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 8.6 dB
1	VA3	-1.9	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1JC Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10B

9.2.1JC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 29 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1JC.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10B specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1JC.1 and 9.2.1JC.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1JC.2, and 9.2.1JC.4.

Table 9.2.1JC.1: Test Parameters for Testing QPSK FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JC.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0)			

Table 9.2.1JC.3: Test Parameters for Testing 16QAM FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JC.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1JC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1JC.4 Method of test

9.2.1JC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in 9.2.1JC.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1JC.1 or 9.2.1JC.3 and levels according to tables 9.2.1JC.5 to 9.2.1JC.8 as appropriate to be applied to serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A to be applied on serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1JC.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10B

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

9.2.1JC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1JC.5 to 9.2.1JC.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7B Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7B.

9.2.1JC.5 Test Requirements

Tables 9.2.1JC.5 to 9.2.1JC.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance and to be applied to both serving cells.

Table 9.2.1JC.5: Test Parameters for Testing QPSK FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1JC.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1JC.7: Test Parameters for Testing 16QAM FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1JC.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

9.2.1JD Single Link Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10C

9.2.1JD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability category 31 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.1JD.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category are determined according to the relevant part of Table 9.2.3F.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10C specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1JD.1 and 9.2.1JD.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1JD.2, and 9.2.1JD.4.

Table 9.2.1JD.1: Test Parameters for Testing QPSK FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JD.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 4 dB
1	VA3	-2	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0)			

Table 9.2.1JD.3: Test Parameters for Testing 16QAM FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1JD.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 8 dB
1	VA3	-2	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1JD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1JD.4 Method of test

9.2.1JD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in 9.2.1JD.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1JD.1 or 9.2.1JD.3 and levels according to tables 9.2.1JD.5 to 9.2.1JD.8 as appropriate to be applied to serving HS-DSCH cell and secondary serving HS-DSCH cells. The configuration of the downlink channels is

defined in table E.5.1A to be applied on serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1JD.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10C

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1JD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1JD.5 to 9.2.1JD.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7B Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7B.

9.2.1JD.5 Test Requirements

Tables 9.2.1JD.5 to 9.2.1JD.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance and to be applied to both serving cells.

Table 9.2.1JD.5: Test Parameters for Testing QPSK FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1JD.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1JD.7: Test Parameters for Testing 16QAM FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1JD.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	1726
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

9.2.1K Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10

9.2.1K.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 9, 10 and 13 to 14, and either the optional enhanced performance requirements type 3 or the optional enhanced performance requirements type 3i.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 15 to 18.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.2.1K.2 Minimum requirements

The performance requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.3A.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10 specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1K.1 and 9.2.1K.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1K.2, and 9.2.1K.4.

Table 9.2.1K.1: Test Parameters for Testing QPSK FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1K.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	2621

Table 9.2.1K.3: Test Parameters for Testing 16QAM FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1K.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	3396

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1K.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1K.4 Method of test

9.2.1K.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with exceptions for information elements listed in table 9.2.1K.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1K.1 or 9.2.1K.3 and levels according to tables 9.2.1K.5 to 9.2.1K.8 as appropriate. The configuration of the downlink channels is defined in table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1K.4A: Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark	Version
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- HS-SCCH Channelisation Code	3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	

9.2.1K.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data.
2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1K.5 to 9.2.1K.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7C.

9.2.1K.5 Test Requirements

Tables 9.2.1K.5 to 9.2.1K.8 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.8C define the secondary and subsequently ranked level settings including test tolerance.

Table 9.2.1K.5: Test Parameters for Testing QPSK FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1K.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621

Table 9.2.1K.7: Test Parameters for Testing 16QAM FRCs H-Set 10

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1K.8: Test requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 8.6 dB
1	VA3	-1.9	3396

9.2.1KA Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10A

9.2.1KA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 21-24 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 25-28 and support the optional enhanced performance requirements type 3 or 3i but not support DB-DC-HSDPA operation.

9.2.1KA.2 Minimum requirements

The performance requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10A specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1KA.1 and 9.2.1KA.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1KA.2, and 9.2.1KA.4.

Table 9.2.1KA.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KA.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 4 dB
1	VA3	-2	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

Table 9.2.1KA.3: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KA.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1KA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1KA.4 Method of test

9.2.1KA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1KA.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1KA.1 or 9.2.1KA.3 and levels according to tables 9.2.1KA.5 to 9.2.1KA.8 as appropriate on both serving HS-DSCH cell and secondary HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1KA.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1KA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data on both the serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1KA.5 to 9.2.1KA.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7C. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7C.

9.2.1KA.5 Test Requirements

Tables 9.2.1KA.5 to 9.2.1KA.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both the serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8C defines the secondary and subsequently ranked level settings including test tolerance to be applied to both the serving cells.

Table 9.2.1KA.5: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1KA.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1KA.7: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1KA.8: Test requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1KB Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10A for DB-DC-HSDPA

9.2.1KB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: DB-DC-HSDPA and HSDPA UE capability categories 21-28 and support the optional enhanced performance requirements type 3 or 3i.

DB-DC-HSDPA is designed to operate in configurations specified in clause 4.2.

9.2.1KB.2 Minimum requirements

The performance requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.3D.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10A specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1KB.1 and 9.2.1KB.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1KB.2, and 9.2.1KB.4.

Table 9.2.1KB.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KB.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

Table 9.2.1KB.3: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KB.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1KB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1KB.4 Method of test

9.2.1KB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.37 for UEs that support receive diversity or figure A.35 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with exceptions for information elements listed in table 9.2.1KB.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1KB.1 or 9.2.1KB.3 and levels according to tables 9.2.1KB.5 to 9.2.1KB.8 as appropriate on both serving HS-DSCH cell and secondary HS-DSCH cell. The Primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C.

Table 9.2.1KB.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10A

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1KB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data on both the serving cells For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1KB.5 to 9.2.1KB.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7C. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7C.

9.2.1KB.5 Test Requirements

Tables 9.2.1KB.5 to 9.2.1KB.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied to both the serving cells. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8C defines the secondary and subsequently ranked level settings including test tolerance to be applied to both the serving cells.

Table 9.2.1KB.5: Test Parameters for Testing QPSK FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1KB.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

Table 9.2.1KB.7: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1KB.8: Test requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.			

9.2.1KC Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10B

9.2.1KC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 29 or 30 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1KC.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10B specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1KC.1 and 9.2.1KC.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1KC.2, and 9.2.1KC.4.

Table 9.2.1KC.1: Test Parameters for Testing QPSK FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KC.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0)			

Table 9.2.1KC.3: Test Parameters for Testing 16QAM FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KC.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1KC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1KC.4 Method of test

9.2.1KC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in table 9.2.1KC.4A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1KC.1 or 9.2.1KC.3 and levels according to tables 9.2.1KC.5 to 9.2.1KC.8 as appropriate on both serving HS-DSCH cell and secondary HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1C and clause D.2.6.

Table 9.2.1KC.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10B

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

9.2.1KC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1KC.5 to 9.2.1KC.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7C. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7C.

9.2.1KC.5 Test Requirements

Tables 9.2.1KC.5 to 9.2.1KC.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied on each cell. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8C defines the secondary and subsequently ranked level settings including test tolerance to be applied on each cell.

Table 9.2.1KC.5: Test Parameters for Testing QPSK FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1KC.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

Table 9.2.1KC.7: Test Parameters for Testing 16QAM FRCs H-Set 10B

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1KC.8: Test requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) $\hat{I}_{or}/I_{oc}$ = 8.6 dB
1	VA3	-1.9	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.			

9.2.1KD Single Link Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 10C

9.2.1KD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 31 or 32 and support the optional enhanced performance requirements type 3 or 3i.

9.2.1KD.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3 are determined according to the relevant part of Table 9.2.3H.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channel H-set 10C specified in Annex C.8.1.10, with the addition of the relevant parameters in Tables 9.2.1KD.1 and 9.2.1KD.3 plus the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1KD.2, and 9.2.1KD.4.

Table 9.2.1KD.1: Test Parameters for Testing QPSK FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KD.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 4 dB
1	VA3	-2	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0)			

Table 9.2.1KD.3: Test Parameters for Testing 16QAM FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{6, 2, 1, 5}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1KD.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 8 dB
1	VA3	-2	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.7 and 9.2.1.8.

9.2.1KD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1KD.4 Method of test

9.2.1KD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.47 for UEs that support receive diversity or figure A.46 for UEs that do not support receive diversity.
2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with exceptions for information elements listed in table 9.2.1KD.4A and with levels according to table E.5.0.
3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1KD.1 or 9.2.1KD.3 and levels according to tables 9.2.1KD.5 to 9.2.1KD.8 as appropriate on both serving HS-DSCH cell and secondary HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1A and is to be applied to serving HS-DSCH cell and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1A.
4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 10 (16 QAM): The information bit payload block is 17548 bits long. Hence the PRBSequence must be at least 17548 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]
5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.
6) Setup the fading simulator with fading conditions as described in table D.2.2.1C and clause D.2.6.

Table 9.2.1KD.4A Specific Message Contents for Fixed Reference Channel (FRC) H-Set 10C

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

9.2.1KD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.8C and start transmitting HSDPA Data on each cell.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1KD.5 to 9.2.1KD.8 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7C. Throughput shall be measured per cell and compared to requirements in table F.6.3.5.2.7C.

9.2.1KD.5 Test Requirements

Tables 9.2.1KD.5 to 9.2.1KD.8 define the primary level settings including test tolerance for all relevant throughput tests to be applied on each cell. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8C defines the secondary and subsequently ranked level settings including test tolerance to be applied on each cell.

Table 9.2.1KD.5: Test Parameters for Testing QPSK FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied

Table 9.2.1KD.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

Table 9.2.1KD.7: Test Parameters for Testing 16QAM FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1KD.8: Test requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) $\hat{I}_{or} / I_{oc}$ = 8.6 dB
1	VA3	-1.9	3396
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10 *NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should be scaled (multiplied by 4.0). The throughput on each cell should be Reference value R.			

9.2.1L Single Link Performance - Enhanced Performance Requirements Type 3i - QPSK, Fixed Reference Channel (FRC) H-Set 6

9.2.1L.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7, 8, 9, 10 and 13 - 20, and the optional enhanced performance requirements type 3i.

9.2.1L.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3i are determined according to the relevant part of Table 9.2.3B.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 6 specified in Annex C.8.1.6 with the addition of the relevant parameters in Table 9.2.1L.1 and the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1L.2.

Table 9.2.1L.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2, 5, 6}
Maximum number of HARQ transmission		4
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.1L.2: Minimum requirement Enhanced requirement type 3i QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$' = 0 dB DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)
1	PB3	-6	691
		-3	1359
2	VA30	-6	661
		-3	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. (Information only I_{oc}/I_{oc}' = -5.27 dB)			
NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6			

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.4.

9.2.1L.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1L.4 Method of test

9.2.1L.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.29 for UEs that support receive diversity

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with exceptions for information elements listed in table 9.2.1L.2A and with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1 according to table 9.2.1L.1 and levels according to tables 9.2.1L.3 to 9.2.1L.4 as appropriate. The configuration of the downlink channels is defined as per E.5E and table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (QPSK): The information bit payload block is 6438 bits long. Hence the PRBSequence must be at least 6438 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

Contents of System Information Block type 11 (FDD)

Table 9.2.1L.2A: Specific Message Contents for Enhanced Performance Type 3i

Information Element	Value/remark	Version
- Intra-frequency cell info list - New intra-frequency cells - Intra-frequency cell id - Cell info - CHOICE mode - Primary CPICH info - Primary scrambling code	 1 0	
- Intra-frequency cell id - Cell info - CHOICE mode - Primary CPICH info - Primary scrambling code	2 16	
- Intra-frequency cell id - Cell info - CHOICE mode - Primary CPICH info - Primary scrambling code	3 32	

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - CHOICE mode - Primary CPICH info - Primary scrambling code - Downlink DPCH info for each RL - DL channelisation code - Spreading factor - Code number	 FDD 0 256 194	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - CHOICE mode - Primary CPICH info - Primary scrambling code - Downlink DPCH info for each RL - DL channelisation code - Spreading factor - Code number	 FDD 0 128 97	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code	 FDD 7	
Downlink information per radio link list - Downlink information for each radio link - CHOICE mode FDD - Primary CPICH info - Primary scrambling code - Downlink DPCH info for each RL - DL channelisation code - Spreading factor - Code number	 FDD 0 128 97	

9.2.1L.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1L.3 to 9.2.1L.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7D

9.2.1L.5 Test Requirements

Tables 9.2.1L.3 to 9.2.1L.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PB3, VA30) vary.

Table 9.2.1L.3: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.1L.4: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}$' = 0 dB, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$' = 0.76 dB DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)
1	PB3	-5.9	691
		-2.9	1359
2	VA30	-5.9	661
		-2.9	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6			

9.2.1LA Enhanced Performance Requirements Type 3i - QPSK, Fixed Reference Channel (FRC) H-Set 6A

9.2.1LA.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support: DC-HSDPA UE capability categories 21-24, and the optional enhanced performance requirements type 3i.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DC-HSDPA UE capability categories 25-28 and the optional enhanced performance requirements type 3i.

9.2.1LA.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3i are determined according to the relevant part of Table 9.2.3E.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 6A specified in Annex C.8.1.6 with the addition of the relevant parameters in Table 9.2.1LA.1 and the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1LA.2.

Table 9.2.1LA.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
Redundancy and constellation version coding sequence		{0,2, 5, 6}	
Maximum number of HARQ transmission		4	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.			

Table 9.2.1LA.2: Minimum requirement Enhanced requirement type 3i QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ ' = 0 dB DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)
1	PB3	-6	691
		-3	1359
2	VA30	-6	661
		-3	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E (Information only I_{oc}/I_{oc}' = -5.27 dB). NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. NOTE 3: For FRC H-Set 6A the reference value should be scaled (multiplied by 2.0).			

For DC-HSDPA, DB-DC-HSDPA or 4C-HSDPA tests which require more than 8 independent faders, the resulting propagation channel(s) shall be generated by considering a number of independent faders needed for one carrier and connecting them to the signal of randomly chosen carrier(s). The maximum number of channel faders on the test will be less than or equal to 8. The remaining carrier(s) shall be connected without a channel fader but with AWGN. The throughput shall be collected only for the carrier(s) connected to channel faders.
The test shall be repeated by choosing carrier(s) excluding already chosen carrier(s) until all the carrier(s) are tested under fading conditions. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the requirements.
All supported carriers shall be configured and activated during the test.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.4 and C.5.4.

9.2.1LA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1LA.4 Method of test

9.2.1LA.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.39 for UEs that support receive diversity

2) Set up an HSDPA call with according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1-2 according to table 9.2.1LA.1 and levels according to tables 9.2.1LA.3 to 9.2.1LA.4 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined as per E.5E and table E.5.1 for the serving HS-DSCH cell and for secondary serving HS-DSCH cell setup P-CPICH, HS-PDSCH and HS-SCCH channels as per E.5E and table E.5.1

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (QPSK): The information bit payload block is 6438 bits long. Hence the PRBSequence must be at least 6438 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1LA.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1LA.3 to 9.2.1LA.4 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7D. Throughput is measured per cell in 2 part tests according to table 9.2.1LA.2A

3) To swap from part test 1 to part test 2, terminate the call and repeat the test, starting from initial conditions step 1 with the other part test connection in A.39.

Table 9.2.1LA.2A: Part test configuration

	Part test 1	**Part test 2**
Serving cell, freq. 1	SS signal faded according to Fig A.39. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.39. Throughput ignored
Secondary serving cell, freq. 2	SS signal delayed according to Fig A.39. Throughput ignored	SS signal faded according to Fig A.39. Throughput measured and compared against table F.6.3.5.2.7D

9.2.1LA.5 Test Requirements

Tables 9.2.1LA.3 to 9.2.1LA.4 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3, where the test time is applicable per part test. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the test requirements, including note 3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PB3, VA30) vary.

Table 9.2.1LA.3: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	**Unit**	**Test 1**	**Test 2**
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)	

Table 9.2.1LA.4: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}'$ = 0 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}'$ = 0.76 dB DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)
1	PB3	-5.9	691
		-2.9	1359
2	VA30	-5.9	661
		-2.9	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 NOTE 3: For FRC H-Set 6A the reference value should be scaled (multiplied by 2.0)			

9.2.1LB Enhanced Performance Requirements Type 3i - QPSK, Fixed Reference Channel (FRC) H-Set 6A for DB-DC-HSDPA

9.2.1LB.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support: DB-DC-HSDPA UE capability categories 21-28, and the optional enhanced performance requirements type 3i.

9.2.1LB.2 Minimum requirements

The performance requirements for a particular UE belonging to a certain HS-DSCH category and supporting the optional enhanced performance requirements type 3i are determined according to the relevant part of Table 9.2.3E.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 6A specified in Annex C.8.1.6 with the addition of the relevant parameters in Table 9.2.1LB.1 and the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1LB.2.

Table 9.2.1LB.1: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
Redundancy and constellation version coding sequence		{0,2, 5, 6}	
Maximum number of HARQ transmission		4	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.			

Table 9.2.1LB.2: Minimum requirement Enhanced requirement type 3i QPSK, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ ' = 0 dB DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)
1	PB3	-6	691
		-3	1359
2	VA30	-6	661
		-3	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. (Information only I_{oc}/I_{oc}' = -5.27 dB)			
NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6			
NOTE 3: For FRC H-Set 6A the reference value should be scaled (multiplied by 2.0)			

For DC-HSDPA, DB-DC-HSDPA or 4C-HSDPA tests which require more than 8 independent faders, the resulting propagation channel(s) shall be generated by considering a number of independent faders needed for one carrier and connecting them to the signal of randomly chosen carrier(s). The maximum number of channel faders on the test will be less than or equal to 8. The remaining carrier(s) shall be connected without a channel fader but with AWGN. The throughput shall be collected only for the carrier(s) connected to channel faders.
The test shall be repeated by choosing carrier(s) excluding already chosen carrier(s) until all the carrier(s) are tested under fading conditions. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the requirements.
All supported carriers shall be configured and activated during the test.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.4 and C.5.4.

9.2.1LB.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1LB.4 Method of test

9.2.1LB.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.45.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1-2 according to table 9.2.1LB.1 and levels according to tables 9.2.1LB.4 to 9.2.1LB.5 as appropriate for both the serving HS-DSCH cell and secondary serving HS-DSCH cell. The configuration of the downlink channels is defined as per E.5E and table E.5.1 for the serving HS-DSCH cell and for secondary serving HS-DSCH cell setup P-CPICH, HS-PDSCH and HS-SCCH channels as per E.5E and table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (QPSK): The information bit payload block is 6438 bits long. Hence the PRBSequence must be at least 6438 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1LB.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1LB.4 to 9.2.1LB.5 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on both the cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7D.Throughput is measured per cell in 2 part tests according to table 9.2.1LB.3

Table 9.2.1LB.3: Part test configuration

	Part test 1	Part test 2
Serving cell, freq. 1	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 2	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D

3) To swap from part test 1 to part test 2, terminate the call and repeat the test, starting from initial conditions step 1 with the other part test connection in A.43.

9.2.1LB.5 Test Requirements

Tables 9.2.1LB.4 to 9.2.1LB.5 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3, where the test time is applicable per part test. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the test requirements, including note 3

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PB3, VA30) vary.

Table 9.2.1LB.4: Test Parameters for Testing QPSK FRCs H-Set 6A

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)	

Table 9.2.1LB.5: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}'$ = 0 dB, Fixed Reference Channel (FRC) H-Set 6A

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}'$ = 0.76 dB DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)
1	PB3	-5.9	691
		-2.9	1359
2	VA30	-5.9	661
		-2.9	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 NOTE 3: For FRC H-Set 6A the reference value should be scaled (multiplied by 2.0)			

9.2.1LC Enhanced Performance Requirements Type 3i - QPSK, Fixed Reference Channel (FRC) H-Set 6B

9.2.1LC.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 29 or 30 and support the optional enhanced performance requirements type 3i.

9.2.1LC.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 29-30 and supporting the optional enhanced performance requirements type 3i are determined according to the relevant part of Table 9.2.3G.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 6B specified in Annex C.8.1.8 with the addition of the relevant parameters in Table 9.2.1LC.1 and the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1LC.2.

Table 9.2.1LC.1: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
Redundancy and constellation version coding sequence		{0,2, 5, 6}	
Maximum number of HARQ transmission		4	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.			

Table 9.2.1LC.2: Minimum requirement Enhanced requirement type 3i QPSK, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ ' = 0 dB DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)
1	PB3	-6	691
		-3	1359
2	VA30	-6	661
		-3	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. (Information only I_{oc}/I_{oc}' = -5.27 dB)			
NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6			
NOTE 3: For FRC H-Set 6B the reference value should be scaled (multiplied by 3.0)			

For DC-HSDPA, DB-DC-HSDPA or 4C-HSDPA tests which require more than 8 independent faders, the resulting propagation channel(s) shall be generated by considering a number of independent faders needed for one carrier and connecting them to the signal of randomly chosen carrier(s). The maximum number of channel faders on the test will be less than or equal to 8. The remaining carrier(s) shall be connected without a channel fader but with AWGN. The throughput shall be collected only for the carrier(s) connected to channel faders.

The test shall be repeated by choosing carrier(s) excluding already chosen carrier(s) until all the carrier(s) are tested under fading conditions. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the requirements.

All supported carriers shall be configured and activated during the test.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.4 and C.5.4.

9.2.1LC.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1LC.4 Method of test

9.2.1LC.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.45.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1-2 according to table 9.2.1LC.1 and levels according to tables 9.2.1LC.4 to 9.2.1LC.5 as appropriate for the serving HS-DSCH cell and all the secondary serving HS-DSCH cell. The configuration of the downlink channels is defined as per E.5E and table E.5.1 for the serving HS-DSCH cell and for all the secondary serving HS-DSCH cell setup P-CPICH, HS-PDSCH and HS-SCCH channels as per E.5E and table E.5.1

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (QPSK): The information bit payload block is 6438 bits long. Hence the PRBSequence must be at least 6438 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1LC.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on all the serving cells. For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1LC.4 to 9.2.1LC.5 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on primary cell and all the secondary cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7D.Throughput is measured per cell in 3 part tests according to table 9.2.1LC.3.

Table 9.2.1LC.3: Part test configuration

	Part test 1	Part test 2	Part test 3
Serving cell, freq. 1	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 2	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 3	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D

3) To swap from one part test to another part test, terminate the call and repeat the test, starting from initial conditions step 1 with the other part test connection in A.43.

9.2.1LC.5 Test Requirements

Tables 9.2.1LC.4 to 9.2.1LC.5 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3, where the test time is applicable per part test. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the test requirements, including note 3.

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on all the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PB3, VA30) vary.

Table 9.2.1LC.4: Test Parameters for Testing QPSK FRCs H-Set 6B

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)	

Table 9.2.1LC.5: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}'$ = 0 dB, Fixed Reference Channel (FRC) H-Set 6B

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}'$ = 0.76 dB DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)
1	PB3	-5.9	691
		-2.9	1359
2	VA30	-5.9	661
		-2.9	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6 NOTE 3: For FRC H-Set 6B the reference value should be scaled (multiplied by 3.0)			

9.2.1LD Enhanced Performance Requirements Type 3i - QPSK, Fixed Reference Channel (FRC) H-Set 6C

9.2.1LD.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in different multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA and HSDPA UE capability categories 29 or 30 and support the optional enhanced performance requirements type 3i.

9.2.1LD.2 Minimum requirements

The performance requirements for a particular UE belonging to HS-DSCH category 31-32 and supporting the optional enhanced performance requirements type 3i are determined according to the relevant part of Table 9.2.3G.

During the Fixed Reference Channel (FRC) tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 6C specified in Annex C.8.1.8 with the addition of the relevant parameters in Table 9.2.1LD.1 and the downlink physical channel setup according to table E.5.1A.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.1LD.2.

Table 9.2.1LD.1: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60	
Redundancy and constellation version coding sequence		{0,2, 5, 6}	
Maximum number of HARQ transmission		4	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.			

Table 9.2.1LD.2: Minimum requirement Enhanced requirement type 3i QPSK, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$' = 0 dB DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)
1	PB3	-6	691
		-3	1359
2	VA30	-6	661
		-3	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. (Information only I_{oc}/I_{oc}' = -5.27 dB). NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. NOTE 3: For FRC H-Set 6C the reference value should be scaled (multiplied by 4.0).			

For DC-HSDPA, DB-DC-HSDPA or 4C-HSDPA tests which require more than 8 independent faders, the resulting propagation channel(s) shall be generated by considering a number of independent faders needed for one carrier and connecting them to the signal of randomly chosen carrier(s). The maximum number of channel faders on the test will be less than or equal to 8. The remaining carrier(s) shall be connected without a channel fader but with AWGN. The throughput shall be collected only for the carrier(s) connected to channel faders.

The test shall be repeated by choosing carrier(s) excluding already chosen carrier(s) until all the carrier(s) are tested under fading conditions. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the requirements.

All supported carriers shall be configured and activated during the test.

The reference for this requirement is TS 25.101 [1] clauses 9.2.1.4 and C.5.4.

9.2.1LD.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multicode reception and channel decoding with incremental redundancy.

9.2.1LD.4 Method of test

9.2.1LD.4.1 Initial conditions

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

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

1) Connect the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.45.

2) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0.

3) Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for test 1-2 according to table 9.2.1LD.1 and levels according to tables 9.2.1LD.4 to 9.2.1LD.5 as appropriate for the serving HS-DSCH cell and all the secondary serving HS-DSCH cells. The configuration of the downlink channels is defined as per E.5E and table E.5.1 for the serving HS-DSCH cell. For all the secondary serving HS-DSCH cell setup P-CPICH, HS-PDSCH and HS-SCCH channels as per E.5.E and table E.5.1A

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 6 (QPSK): The information bit payload block is 6438 bits long. Hence the PRBSequence must be at least 6438 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channels: i.e. Process number is continued exactly after 6 TTIs.

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

9.2.1LD.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Table E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cells only P-CPICH, HS-PDSCH and HS-SCCH are configured.

2) For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.1LD.4 to 9.2.1LD.5 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval on primary cell and all the secondary cells and decide pass or fail according to Annex F.6.3 table F.6.3.5.2.7D.Throughput is measured per cell in 4 part tests according to table 9.2.1LD.3

Table 9.2.1LD.3: Part test configuration

	Part test 1	Part test 2	Part test 3	Part test 4
Serving cell, freq. 1	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 2	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 3	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D	SS signal delayed according to Fig A.43. Throughput ignored
Secondary serving cell, freq. 4	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored	SS signal delayed according to Fig A.43. Throughput ignored	SS signal faded according to Fig A.43. Throughput measured and compared against table F.6.3.5.2.7D

3) To swap from one part test to another part test , terminate the call and repeat the test, starting from initial conditions step 1 with the other part test connection in A.43.

9.2.1LD.5 Test Requirements

Tables 9.2.1LD.4 to 9.2.1LD.5 define the primary level settings including test tolerance for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3, where the test time is applicable per part test. The sum of all the collected throughputs from each carrier shall be compared against the reference value in the test requirements, including note 3

Table E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance to be applied on all the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PB3, VA30) vary.

Table 9.2.1LD.4: Test Parameters for Testing QPSK FRCs H-Set 6C

Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)	

Table 9.2.1LD.5: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}'$ = 0 dB, Fixed Reference Channel (FRC) H-Set 6C

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}'$ = 0.76 dB DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)
1	PB3	-5.9	691
		-2.9	1359
2	VA30	-5.9	661
		-2.9	1327
NOTE 1: I_{oc}/I_{oc}' is computed based on the relations shown in E.5E. NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6. NOTE 3: For FRC H-Set 6C the reference value should be scaled (multiplied by 4.0)			

9.2.2 Open Loop Diversity Performance

The test cases in the following sections 9.2.2A to 9.2.2D define the Open Loop Diversity Performance tests for the different H-Sets for the different HS-DSCH Categories as defined in tables 9.2.1, 9.2.2 and 9.2.3.

9.2.2A Open Loop Diversity Performance - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.2A.1 Definition and applicability

The receiver open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 1 to 6 but not supporting the optional enhanced performance requirements types 1, 2, 3, or 3i.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 - 10 but not supporting the optional enhanced performance requirements types 1, 2, 3, or 3i.

9.2.2A.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.2A.1 and 9.2.2A.3 plus the downlink physical channel setup according to table E.5.2.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.2A.2 and 9.2.2A.4.

Table 9.2.2A.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2A.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	77	375
		-3	180	475
2	PB3	-6	20	183
		-3	154	274
3	VA30	-6	15	187
		-3	162	284
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2A.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2A.4: Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	295
		-3	463
2	PB3	-6	24
		-3	243
3	VA30	-6	35
		-3	251

* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1
2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)
3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)

The reference for this requirement is TS 25.101 [1] clauses 9.2.2.1 and 9.2.2.2.

9.2.2A.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.2A.4 Method of test

9.2.2A.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 the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.12.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.2A.1 or 9.2.2A.3 and levels according to tables 9.2.2A.6 to 9.2.2A.9. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.2A.5: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.2A.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.2A.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.2A.6 to 9.2.2A.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3.1 and F.6.3.5.3.2. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.2A.5 Test Requirements

Tables 9.2.2A.6 to 9.2.2A.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (open loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.2A.6: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2A.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	77	375
		-2.9	180	475
2	PB3	-5.9	20	183
		-2.9	154	274
3	VA30	-5.9	15	187
		-2.9	162	284
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2A.8: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2A.9: Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	295
		-2.9	463
2	PB3	-5.9	24
		-2.9	243
3	VA30	-5.9	35
		-2.9	251
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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.

9.2.2B Open Loop Diversity Performance - QPSK, Fixed Reference Channel (FRC) H-Set 4/5

9.2.2B.1 Definition and applicability

The receiver open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 11 and 12.

9.2.2B.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 4/5 specified in Annex C.8.1.4 and C.8.1.5 respectively, with the addition of the relevant parameters in Table 9.2.2B.1 plus the downlink physical channel setup according to table E.5.2.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.2B.2 and 9.2.2B.3.

Table 9.2.2B.1: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2B.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	70	369
		-3	171	471
2	PB3	-6	14	180
		-3	150	276
3	VA30	-6	11	184
		-3	156	285
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.2B.3: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	116	563
		-3	270	713
2	PB3	-6	30	275
		-3	231	411
3	VA30	-6	23	281
		-3	243	426
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5				

The reference for this requirement is TS 25.101 [1] clause 9.2.2.3.

9.2.2B.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.2B.4 Method of test

9.2.2B.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.22 does not need to be used.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.2B.1 and levels according to tables 9.2.2B.5 to 9.2.2B.7. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.2B.4: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.2B.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.2B.4, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.2B.5 to 9.2.2B.7 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3.3 and F.6.3.5.3.4. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.2B.5 Test Requirements

Tables 9.2.2B.5 to 9.2.2B.7 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (open loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.2B.5: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2B.6: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	70	369
		-2.9	171	471
2	PB3	-5.9	14	180
		-2.9	150	276
3	VA30	-5.9	11	184
		-2.9	156	285
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.2B.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	116	563
		-2.9	270	713
2	PB3	-5.9	30	275
		-2.9	231	411
3	VA30	-5.9	23	281
		-2.9	243	426
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 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.

9.2.2C Open Loop Diversity Performance - Enhanced Performance Requirements Type 1 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.2C.1 Definition and applicability

The receiver open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 10 and the optional enhanced performance requirements type 1.

9.2.2C.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant parts of Table 9.2.2..

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.2C.1 and 9.2.2C.3 plus the downlink physical channel setup according to table E.5.2.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.2C.2 and 9.2.2C.4.

Table 9.2.2C.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2C.2: Minimum requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	N/A	268
		-9	N/A	407
		-6	197	N/A
		-3	333	N/A
2	PB3	-9	N/A	183
		-6	152	288
		-3	251	N/A
3	VA30	-9	N/A	197
		-6	164	307
		-3	261	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2C.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2C.4: Minimum requirement Enhanced requirement type 1, 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-9	340
		-6	513
2	PB3	-6	251
		-3	374
3	VA30	-6	280
		-3	398
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.2.1 and 9.2.2.2.

9.2.2C.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.2C.4 Method of test

9.2.2C.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.2C.1 or 9.2.2C.3 and levels according to tables 9.2.2C.6 to 9.2.2C.9. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.5.

Table 9.2.2C.5: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.2C.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.2C.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.2C.6 to 9.2.2C.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3.5 and F.6.3.5.3.6. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.2C.5 Test Requirements

Tables 9.2.2C.6 to 9.2.2C.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (open loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.2C.6: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2C.7: Test requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-11.9	N/A	268
		-8.9	N/A	407
		-5.9	197	N/A
		-2.9	333	N/A
2	PB3	-8.9	N/A	183
		-5.9	152	288
		-2.9	251	N/A
3	VA30	-8.9	N/A	197
		-5.9	164	307
		-2.9	261	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2C.8: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2C.9: Test requirement Enhanced requirement type 1, 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-8.9	340
		-5.9	513
2	PB3	-5.9	251
		-2.9	374
3	VA30	-5.9	280
		-2.9	398
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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.

9.2.2D Open Loop Diversity Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 3

9.2.2D.1 Definition and applicability

The receiver open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 7 - 10 and the optional enhanced performance requirements type 2 but not the optional enhanced performance requirements Type 3 or Type 3i.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 13 and 14 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.2D.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 3 specified in Annex C.8.1.3, with the addition of the relevant parameters in Tables 9.2.2D.1 and 9.2.2D.3 plus the downlink physical channel setup according to table E.5.2.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.2D.2 and 9.2.2D.4.

Table 9.2.2D.1: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2D.2: Minimum requirement Enhanced performance requirements Type 2, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	77	375
		-3	180	475
2	PB3	-6	20	183
		-3	154	274
3	VA30	-6	15	187
		-3	162	284
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2D.3: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2D.4: Minimum requirement Enhanced performance requirements Type 2, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-6	295
		-3	463
2	PB3	-6	24
		-3	243
3	VA30	-6	35
		-3	251
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

NOTE: Tables 9.2.2D.2 and 9.2.2D.4 are based on core requirements for minimum requirement as explained in Table 9.2.3.

The reference for this requirement is TS 25.101 [1] clauses 9.2.2.1 and 9.2.2.2.

9.2.2D.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.2D.4 Method of test

9.2.2D.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.22 does not need to be used.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.2D.1 or 9.2.2D.3 and levels according to tables 9.2.2D.6 to 9.2.2D.9. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.2D.5: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.2D.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.2D.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.2D.6 to 9.2.2D.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3.1 and F.6.3.5.3.2. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.2D.5 Test Requirements

Tables 9.2.2D.6 to 9.2.2D.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (open loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.2D.6: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2D.7: Test requirement Enhanced performance requirements Type 2, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	77	375
		-2.9	180	475
2	PB3	-5.9	20	183
		-2.9	154	274
3	VA30	-5.9	15	187
		-2.9	162	284
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2D.8: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2D.9: Test requirement Enhanced performance requirements Type 2, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	295
		-2.9	463
2	PB3	-5.9	24
		-2.9	243
3	VA30	-5.9	35
		-2.9	251
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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.

9.2.2E Open Loop Diversity Performance - Enhanced Performance Requirements Type 3 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 3

Editor's note: This test is copied from 9.2.2C with the change that only H-Set3 is tested and that applicability is enhanced performance requirements type 3 instead of type 1.

9.2.2E.1 Definition and applicability

The receiver open loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 7 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 to 10, and 13 to 14, and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 to 18.

The requirements and this test apply for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 to 10, and 13 to 14, and the optional enhanced performance requirements type 3i.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.2.2E.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant parts of Table 9.2.3A.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.2E.1 and 9.2.2E.3 plus the downlink physical channel setup according to table E.5.2.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.2E.2 and 9.2.2E.4.

Table 9.2.2E.1: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2E.2: Minimum requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-12	N/A	268
		-9	N/A	407
		-6	197	N/A
		-3	333	N/A
2	PB3	-9	N/A	183
		-6	152	288
		-3	251	N/A
3	VA30	-9	N/A	197
		-6	164	307
		-3	261	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2E.3: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.2E.4: Minimum requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-9	340
		-6	513
2	PB3	-6	251
		-3	374
3	VA30	-6	280
		-3	398
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

NOTE: Tables 9.2.2E.2 and 9.2.2E.4 are based on core requirements for enhanced requirement type 1 as explained in Table 9.2.3A.

The reference for this requirement is TS 25.101 [1] clauses 9.2.2.1 and 9.2.2.2.

9.2.2E.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.2E.4 Method of test

9.2.2E.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.
2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.2E.1 or 9.2.2E.3 and levels according to tables 9.2.2E.6 to 9.2.2E.9. The configuration of the downlink channels is defined in table E.5.2.
3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].
4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.5.

Table 9.2.2E.5: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.2E.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.2E.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.2E.6 to 9.2.2E.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.3.5 and F.6.3.5.3.6. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.2E.5 Test Requirements

Tables 9.2.2E.6 to 9.2.2E.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3,PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (open loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.2E.6: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2E.7: Test requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-11.9	N/A	268
		-8.9	N/A	407
		-5.9	197	N/A
		-2.9	333	N/A
2	PB3	-8.9	N/A	183
		-5.9	152	288
		-2.9	251	N/A
3	VA30	-8.9	N/A	197
		-5.9	164	307
		-2.9	261	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.2E.8: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.2E.9: Test requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-8.9	340
		-5.9	513
2	PB3	-5.9	251
		-2.9	374
3	VA30	-5.9	280
		-2.9	398
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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.

9.2.3 Closed Loop Diversity Performance

The test cases in the following sections 9.2.3A to 9.2.3D define the Closed Loop Diversity Performance tests for the different H-Sets for the different HS-DSCH Categories as defined in tables 9.2.1, 9.2.2 and 9.2.3.

9.2.3A Closed Loop Diversity Performance - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.3A.1 Definition and applicability

The receiver closed loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 1 to 6 but not supporting the optional enhanced performance requirements types 1, 2, 3 or 3i.

The requirements and this test apply also for Release 6 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 - 10 but not supporting the optional enhanced performance requirements types 1, 2, 3 or 3i.

9.2.3A.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in tables 9.2.3A.1 and 9.2.3A.3 plus the downlink physical channel setup according to table E.5.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.3A.2 and 9.2.3A.4.

Table 9.2.3A.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3A.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	118	399
		-3	225	458
2	PB3	-6	50	199
		-3	173	301
3	VA30	-6	47	204
		-3	172	305
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integers) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.3A.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3A.4 Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	361
		-3	500
2	PB3	-6	74
		-3	255
3	VA30	-6	84
		-3	254
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.3.1 and 9.2.3.2.

9.2.3A.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.3A.4 Method of test

9.2.3A.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 the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.12.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.3A.1 or 9.2.3A.3 and levels according to tables 9.2.3A.6 to 9.2.3A.9. The configuration of the downlink channels is defined in table E.5.3.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload

block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.3A.5: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.3A.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.3A.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.3A.6 to 9.2.3A.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.1 and F.6.3.5.4.2. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.3A.5 Test Requirements

Tables 9.2.3A.6 to 9.2.3A.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (closed loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.3: column Note.

Table 9.2.3A.6: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3A.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	118	399
		-2.9	225	458
2	PB3	-5.9	50	199
		-2.9	173	301
3	VA30	-5.9	47	204
		-2.9	172	305
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integers) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.3A.8: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3A.9 Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	361
		-2.9	500
2	PB3	-5.9	74
		-2.9	255
3	VA30	-5.9	84
		-2.9	254
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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

9.2.3B Closed Loop Diversity Performance - QPSK, Fixed Reference Channel (FRC) H-Set 4/5

9.2.3B.1 Definition and applicability

The receiver closed loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 5 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 11 and 12

9.2.3B.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.1.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 4/5 specified in Annex C.8.1.4 and C.8.1.5 respectively, with the addition of the relevant parameters in Tables 9.2.3B.1 plus the downlink physical channel setup according to table E.5.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.3B.2 and 9.2.3B.3.

Table 9.2.3B.1: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3B.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	114	398
		-3	223	457
2	PB3	-6	43	196
		-3	167	292
3	VA30	-6	40	199
		-3	170	305
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.3B.3: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	177	599
		-3	338	687
2	PB3	-6	75	299
		-3	260	452
3	VA30	-6	71	306
		-3	258	458
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5				

The reference for this requirement is TS 25.101 [1] clause 9.2.3.3.

9.2.3B.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.3B.4 Method of test

9.2.3B.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 the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.22 does not need to be used.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.3B.1 and levels according to tables 9.2.3B.5 to 9.2.3B.7. The configuration of the downlink channels is defined in table E.5.3.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.3B.4: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.3B.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.3B.4, with levels according to table E.5.0.
2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.
3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.3B.5 to 9.2.3B.7 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.3 and F.6.3.5.4.4. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.3B.5 Test Requirements

Tables 9.2.3B.5 to 9.2.3B.7 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (closed loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.3: column Note.

Table 9.2.3B.5: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3B.6: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	114	398
		-2.9	223	457
2	PB3	-5.9	43	196
		-2.9	167	292
3	VA30	-5.9	40	199
		-2.9	170	305
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

Table 9.2.3B.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	177	599
		-2.9	338	687
2	PB3	-5.9	75	299
		-2.9	260	452
3	VA30	-5.9	71	306
		-2.9	258	458
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 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

9.2.3C Closed Loop Diversity Performance Enhanced Performance Requirements Type 1, QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

9.2.3C.1 Definition and applicability

The receiver closed loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 1 to 10 and the optional enhanced performance requirements type 1.

9.2.3C.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.2.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.3C.1 and 9.2.3C.3 plus the downlink physical channel setup according to table E.5.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.3C.2 and 9.2.3C.4.

Table 9.2.3C.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3C.2: Minimum requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-12	N/A	297
		-9	N/A	410
		-6	242	N/A
		-3	369	N/A
2	PB3	-9	N/A	194
		-6	170	308
		-3	272	N/A
3	VA30	-9	N/A	204
		-6	172	315
		-3	270	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integers) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.3C.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3C.4 Minimum requirement Enhanced requirement type 1, 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-9	376
		-6	532
2	PB3	-6	267
		-3	393
3	VA30	-6	279
		-3	404
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

The reference for this requirement is TS 25.101 [1] clauses 9.2.3.1 and 9.2.3.2.

9.2.3C.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.3C.4 Method of test

9.2.3C.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.
2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.3C.1 or 9.2.3C.3 and levels according to tables 9.2.3C.6 to 9.2.3C.9. The configuration of the downlink channels is defined in table E.5.3.
3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].
4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.5.

Table 9.2.3C.5: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.3C.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.3C.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all re levant Îor/Ioc, for all relevant H-sets in tables 9.2.3C.6 to 9.2.3C.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.1 and F.6.3.5.4.2. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.3C.5 Test Requirements

Tables 9.2.3C.6 to 9.2.3C.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (closed loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.3: column Note.

Table 9.2.3C.6: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3C.7: Test requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-11.9	N/A	297
		-8.9	N/A	410
		-5.9	242	N/A
		-2.9	369	N/A
2	PB3	-8.9	N/A	194
		-5.9	170	308
		-2.9	272	N/A
3	VA30	-8.9	N/A	204
		-5.9	172	315
		-2.9	270	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integers) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)				

Table 9.2.3C.8: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3C.9 Test requirement Enhanced requirement type 1, 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-8.9	376
		-5.9	532
2	PB3	-5.9	267
		-2.9	393
3	VA30	-5.9	279
		-2.9	404
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1 2) For Fixed Reference Channel (FRC) H-Set 2 the reference values for R should be scaled (multiplied by 1.5 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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

9.2.3D Closed Loop Diversity Performance - Enhanced Performance Requirements Type 2 - QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 6/3

9.2.3D.1 Definition and applicability

The receiver closed loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply for Release 6 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 7 - 10 and the optional enhanced performance requirements type 2 but not the optional enhanced performance requirements Type 3 or Type 3i.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 13 and 14 but not the optional enhanced performance requirements Type 3 or Type 3i.

9.2.3D.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.3.

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 6/3 specified in Annex C.8.1.6 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.3D.1, 9.2.3D.3, 9.2.3D.5 and 9.2.3D.7 plus the downlink physical channel setup according to table E.5.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.3D.2, 9.2.3D.4, 9.2.3D.6 and 9.2.3D.8.

Table 9.2.3D.1: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,2,5,6}
Maximum number of HARQ transmission		4
Feedback Error Rate	%	4
Closed loop timing adjustment mode		1
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.3D.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PB3	-3	1536

Table 9.2.3D.3: Test Parameters for Testing 16-QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{6,2,1,5}
Maximum number of HARQ transmission		4
Feedback Error Rate	%	4
Closed loop timing adjustment mode		1
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.		

Table 9.2.3D.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PB3	-3	1154

Table 9.2.3D.5: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3D.6: Minimum requirement Enhanced performance requirements Type 2, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	118	399
		-3	225	458
2	PB3	-6	50	199
		-3	173	*Note 2
3	VA30	-6	47	204
		-3	172	305
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7, 8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and E_c/I_{or} =-3dB are set according to H-Set 6.				

Table 9.2.3D.7: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3D.8 Minimum requirement Enhanced performance requirements Type 2, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-6	361
		-3	500
2	PB3	-6	74
		-3	*Note 2
3	VA30	-6	84
		-3	254
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7 and 8 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and E_c/I_{or} =-3dB are set according to H-Set 6.			

NOTE: Tables 9.2.3D.2, 9.2.3D.4, 9.2.3D.6 and 9.2.3D.8 are based on core requirements for minimum requirement as explained in Table 9.2.3.

The reference for this requirement is TS 25.101 [1] clauses 9.2.3.1, 9.2.3.2, 9.2.3.4 and 9.2.3.5.

9.2.3D.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.3D.4 Method of test

9.2.3D.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.22 does not need to be used.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.3D.1, 9.2.3D.3, 9.2.3D.5 or 9.2.3D.7 and levels according to tables 9.2.3D.10 to 9.2.3D.17. The configuration of the downlink channels is defined in table E.5.3.
3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].
4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.7.

Table 9.2.3D.9: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.3D.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.3D.9, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.3D.10 to 9.2.3D.17 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.1, F.6.3.5.4.2, F.6.3.5.4.5 and F.6.3.5.4.6. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.3D.5 Test Requirements

Tables 9.2.3D.10 to 9.2.3D.17 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (closed loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.3: column Note.

Table 9.2.3D.10: Test Parameters for Testing QPSK FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.3D.11: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PB3	-2.9	1536

Table 9.2.3D.12: Test Parameters for Testing 16-QAM FRCs H-Set 6

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)

Table 9.2.3D.13: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PB3	-2.9	1154

Table 9.2.3D.14: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3D.15: Test requirement Enhanced performance requirements Type 2, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	118	399
		-2.9	225	458
2	PB3	-5.9	50	199
		-2.9	173	*Note 2
3	VA30	-5.9	47	204
		-2.9	172	305

* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)
2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7, 8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and E_c/I_{or} =-3dB are set according to H-Set 6.

Table 9.2.3D.16: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3D.17 Test requirement Enhanced performance requirements Type 2, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-5.9	361
		-2.9	500
2	PB3	-5.9	74
		-2.9	*Note 2
3	VA30	-5.9	84
		-2.9	254
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer) 2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7, 8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and E_c/I_{or} =-3dB are set according to H-Set 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

9.2.3E Closed Loop Diversity Performance Enhanced Performance Requirements Type 3, QPSK/16QAM, Fixed Reference Channel (FRC) H-Set 3

Editor's note: This test is copied from 9.2.3C with the change that only H-Set3 is tested and that applicability is enhanced performance requirements type 3 instead of type 1.

9.2.3E.1 Definition and applicability

The receiver closed loop transmit diversity performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments are determined by the information bit throughput R.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7 - 10 and 13 - 14 and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 7 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 15 - 18.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support: HSDPA UE capability categories 7 - 10 and 13 - 14 and the optional enhanced performance requirements type 3i.

The requirements and this test apply also for Release 8 and later releases to all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.2.3E.2 Minimum requirements

Requirements for a particular UE belonging to certain HS-DSCH category are determined according to the relevant part of Table 9.2.3A .

The requirements are specified in terms of minimum information bit throughput R for the DL reference channels H-set 1/2/3 specified in Annex C.8.1.1, C.8.1.2 and C.8.1.3 respectively, with the addition of the relevant parameters in Tables 9.2.3E.1 and 9.2.3E.3 plus the downlink physical channel setup according to table E.5.3.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in tables 9.2.3E.2 and 9.2.3E.4.

Table 9.2.3E.1: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3E.2: Minimum requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB
1	PA3	-12	N/A	297
		-9	N/A	410
		-6	242	N/A
		-3	369	N/A
2	PB3	-9	N/A	194
		-6	170	308
		-3	272	N/A
3	VA30	-9	N/A	204
		-6	172	315
		-3	270	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to I+1, i integer)				

Table 9.2.3E.3: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60		
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0		
Redundancy and constellation version coding sequence		{6,2,1,5}		
Maximum number of HARQ transmission		4		
Feedback Error Ratio	%	4		
Closed loop timing adjustment mode		1		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Table 9.2.3E.4: Minimum requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-9	376
		-6	532
2	PB3	-6	267
		-3	393
3	VA30	-6	279
		-3	404
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

NOTE: Tables 9.2.3E.2 and 9.2.3E.4 are based on core requirements for enhanced requirement type 1 as explained in Table 9.2.3.

The reference for this requirement is TS 25.101 [1] clauses 9.2.3.1 and 9.2.3.2.

9.2.3E.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.3E.4 Method of test

9.2.3E.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-3 according to table 9.2.3E.1 or 9.2.3E.3 and levels according to tables 9.2.3E.6 to 9.2.3E.9. The configuration of the downlink channels is defined in table E.5.3.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 1 (16 QAM): The information bit payload block is 4664 bits long. Hence the PRBS must be at least 4664 * 10 bits long) Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in table D.2.2.1.A and clause D.2.5.

Table 9.2.3E.5: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.2.3E.4.2 Procedure

1. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.3E.5, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for all relevant H-sets in tables 9.2.3E.6 to 9.2.3E.9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.1 and F.6.3.5.4.2. ACK is counted as a pass. NACK and statDTX are counted as a failure.

9.2.3E.5 Test Requirements

Tables 9.2.3E.6 to 9.2.3E.9 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8B define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, PB3, VA30, VA 120) vary.

Note that the levels in tables E.5.6 to E.5.8B, when applied in this subclause (closed loop transmit diversity) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.3: column Note.

Table 9.2.3E.6: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3E.7: Test requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 0.8 dB	T-put R (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.8 dB
1	PA3	-11.9	N/A	297
		-8.9	N/A	410
		-5.9	242	N/A
		-2.9	369	N/A
2	PB3	-8.9	N/A	194
		-5.9	170	308
		-2.9	272	N/A
3	VA30	-8.9	N/A	204
		-5.9	172	315
		-2.9	270	N/A
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to I+1, i integer)				

Table 9.2.3E.8: Test Parameters for Testing 16QAM FRCs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		

Table 9.2.3E.9: Test requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	T-put R (kbps) * $\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-8.9	376
		-5.9	532
2	PB3	-5.9	267
		-2.9	393
3	VA30	-5.9	279
		-2.9	404
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference Channel (FRC) H-Set 3 the reference values for R should be scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where values of i+1/2 are rounded up to i+1, i integer)			

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

9.2.4 MIMO Performance

The test case in section 9.2.4A defines the MIMO Performance test for the Fixed Reference Channel (FRC) H-Set 9.

9.2.4A MIMO Performance - Fixed Reference Channel (FRC) H-Set 9

9.2.4A.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 15 - 18.

9.2.4A.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 9 specified in Annex C.8.1.9, with the addition of the parameters in Table 9.2.4A.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled. The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for single transport block transmission shall be as follows: the reported preferred primary precoding vector shall be applied to the primary transport block.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4A.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4A.1: Test Parameters for Testing MIMO FRC H-Set 9

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/1		1/2	
PCI/CQI reporting Error Rate	%	0		0	
Number of transport blocks		2		1	
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK		Primary Transport Block: 16QAM Secondary Transport Block is not used.	

Table 9.2.4A.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9 with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c/I_{or} = -2 dB
1	PA3	10	5563
2	VA3	10	4347
3	PA3	6	3933
4	VA3	6	3011

The reference for this requirement is TS 25.101 [1] clause 9.2.4.1.

9.2.4A.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4A.4 Method of test

9.2.4A.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 the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.22.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.4A.1 and levels according to tables 9.2.4A.4 and 9.2.4A.5. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 9 dual stream [tests 1 & 2]: The information bit payload block is 17568 bits for the primary block using 16QAM and 9736 bits for the secondary block using QPSK. Hence the PRBS must be at least 17568 * 10 bits long for the primary block and 9736 * 10 bits for the secondary block. Also. For fixed reference Channel Definition H-set 9 single stream [tests 3 & 4]: The information bit payload block, there is only one payload block size which is 17568 bits using 16QAM, hence the PRBS must be at least 17568 * 10 bits long for the single stream case). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2.

Table 9.2.4A.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.2.4A.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.4A.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-set 9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and, for test 3 and 4, decide pass or fail according to Annex F.6.3 table F.6.3.5.4.10. ACK is counted as a success. NACK and statDTX are counted as a failure.

4. For test 1 and 2 there are 4 possible contributions to the throughput per TTI.

Primary stream / Secondary stream	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary stream	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.10

9.2.4A.5 Test Requirements

Tables 9.2.4A.4 and 9.2.4A.5 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8C, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4A.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 9

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH	P-CPICH	P-CPICH	P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		-60 (no test tolerance applied)	

Table 9.2.4A.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 9 with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c/I_{or} = -1.9 dB
1	PA3	10.8	5563
2	VA3	10.8	4347
3	PA3	6.8	3933
4	VA3	6.8	3011

9.2.4B MIMO Performance - Fixed Reference Channel (FRC) H-Set 11

9.2.4B.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 19-20.

9.2.4B.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 11 specified in Annex C.8.1.11, with the addition of the parameters in Table 9.2.4B.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4B.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4B.1: Test Parameters for Testing MIMO FRC H-Set 11

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4B.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 11 with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c/I_{or} = -1.5 dB
1	PA3	18	9980

The reference for this requirement is TS 25.101 [1] clause 9.2.4.2.

9.2.4B.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4B.4 Method of test

9.2.4B.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.

2. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.22.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters according to table 9.2.4B.1 and levels according to tables 9.2.4B.4 and 9.2.4B.5. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (the information bit payload block is 26504 bits for the primary block using 64QAM and 17568 bits for the secondary block using 16QAM. Hence the PRBS must be at least 26504 * 10 bits long for the primary block and 17568 * 10 bits for the secondary block.). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2.

RADIO BEARER SETUP

Table 9.2.4B.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.2.4B.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.4B.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by table E.5.9 and start transmitting HSDPA Data.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-set 11 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval. ACK is counted as a success. NACK and statDTX are counted as a failure.

4. There are 4 possible contributions to the throughput per TTI.

Primary stream / Secondary stream	ACK on the Primary stream (64QAM)	NACK on the Primary stream
ACK on the secondary stream (16QAM)	(26504 + 17568) bit per TTI	17568 bit per TTI
NACK on the secondary stream	26504 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.7

9.2.4B.5 Test Requirements

Tables 9.2.4B.4 and 9.2.4B.5 define the primary level settings including test tolerance and test parameters. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8D define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8D, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4B.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4B.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 11 with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c/I_{or} = -1.4 dB
1	PA3	18.8	9980

9.2.4C MIMO Performance - Fixed Reference Channel (FRC) H-Set 9A

9.2.4C.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 9 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 25 - 28 but not supporting Dual band operation.

9.2.4C.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 9A specified in Annex C.8.1.9, with the addition of the parameters in Table 9.2.4C.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for single transport block transmission shall be as follows: the reported preferred primary precoding vector shall be applied to the primary transport block.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in table 9.2.4C.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4C.1: Test Parameters for Testing MIMO FRC H-Set 9A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/1		1/2	
PCI/CQI reporting Error Rate	%	0		0	
Number of transport blocks		2		1	
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK		Primary Transport Block: 16QAM Secondary Transport Block is not used.	

Table 9.2.4C.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -2 dB
1	PA3	10	5563
2	VA3	10	4347
3	PA3	6	3933
4	VA3	6	3011
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.1.

9.2.4C.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4C.4 Method of test

9.2.4C.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table 9.2.4C.1 and levels according to tables 9.2.4C.4 and 9.2.4C.5. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-Set 9A dual stream [tests 1 & 2]: The information bit payload block is 17568 bits for the primary block using 16QAM and 9736 bits for the secondary block using QPSK. Hence the PRBS must be at least 17568 * 10 bits long for the primary block and 9736 * 10 bits for the secondary block. Also. For fixed reference Channel Definition H-Set 9A single stream [tests 3 & 4]: The information bit payload block, there is only one payload block size which is 17568 bits using 16QAM, hence the PRBS must be at least 17568 * 10 bits long for the single stream case). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2. on each of the serving cells.

Table 9.2.4C.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.2.4C.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4C.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 9A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and, for test 3 and 4, decide pass or fail according to Annex F.6.3 table F.6.3.5.4.9. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. For test 1 and 2 there are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary stream	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.10

9.2.4C.5 Test Requirements

Tables 9.2.4C.4 and 9.2.4C.5 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8C, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4C.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 9A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH	P-CPICH	P-CPICH	P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		-60 (no test tolerance applied)	

Table 9.2.4C.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.9 dB
1	PA3	10.8	5563
2	VA3	10.8	4347
3	PA3	6.8	3933
4	VA3	6.8	3011
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0)			

9.2.4CA MIMO Performance - Fixed Reference Channel (FRC) H-Set 9A for DB DC-HSDPA

9.2.4CA.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support DB-DC-HSDPA and HSDPA UE capability categories 25 - 28.

9.2.4CA.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 9A specified in Annex C.8.1.9, with the addition of the parameters in Table 9.2.4CA.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for single transport block transmission shall be as follows: the reported preferred primary precoding vector shall be applied to the primary transport block.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in table 9.2.4CA.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4CA.1: Test Parameters for Testing MIMO FRC H-Set 9A

<table>
<tr><th>Parameter</th><th>Unit</th><th>Test 1</th><th>Test 2</th><th>Test 3</th><th>Test 4</th></tr>
<tr><td>I_{oc}</td><td>dBm/3.84 MHz</td><td colspan="4">-60</td></tr>
<tr><td>DPCH frame offset ($\tau_{DPCH,n}$)</td><td>Chip</td><td colspan="4">0</td></tr>
<tr><td>Redundancy and constellation version coding sequence</td><td></td><td colspan="4">{0,3,2,1} for 16-QAM and QPSK</td></tr>
<tr><td>Maximum number of HARQ transmission</td><td></td><td colspan="4">4</td></tr>
<tr><td>MIMO N_cqi_typeA/M_cqi ratio</td><td></td><td colspan="2">1/1</td><td colspan="2">1/2</td></tr>
<tr><td>PCI/CQI reporting Error Rate</td><td>%</td><td colspan="2">0</td><td colspan="2">0</td></tr>
<tr><td>Number of transport blocks</td><td></td><td colspan="2">2</td><td colspan="2">1</td></tr>
<tr><td>Modulation</td><td></td><td colspan="2">Primary Transport Block: 16QAM
Secondary Transport Block: QPSK</td><td colspan="2">Primary Transport Block: 16QAM
Secondary Transport Block is not used.</td></tr>
</table>

Table 9.2.4CA.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -2 dB
1	PA3	10	5563
2	VA3	10	4347
3	PA3	6	3933
4	VA3	6	3011
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0).			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.1.

9.2.4CA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4CA.4 Method of test

9.2.4CA.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to Table 9.2.4CA.1 and levels according to tables 9.2.4CA.4 and 9.2.4CA.5. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-Set 9A dual stream [tests 1 & 2]: The information bit payload block is 17568 bits for the primary block using 16QAM and 9736 bits for the secondary block using QPSK. Hence the PRBS must be at least 17568 * 10 bits long for the primary block and 9736 * 10 bits for the secondary block. Also for fixed reference Channel Definition H-Set 9A single stream [tests 3 & 4]: The information bit payload block, there is only one payload block size which is 17568 bits using 16QAM, hence the PRBS must be at least 17568 * 10 bits long for the single stream case). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2. on each of the serving cells.

Table 9.2.4CA.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters - MIMO operation - MIMO N_cqi_typeA/M_cqi ratio - MIMO pilot configuration - CHOICE *Second CPICH pattern* >Antenna2 P-CPICH - Precoding weight set restriction	 Start 1/2 Not Present

9.2.4CA.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4CA.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by Table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 9A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and, for test 3 and 4, decide pass or fail according to Annex F.6.3 table F.6.3.5.4.10. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. For test 1 and 2 there are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary stream	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.10

9.2.4CA.5 Test Requirements

Tables 9.2.4CA.4 and 9.2.4CA.5 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8C, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4CA.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 9A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH	P-CPICH	P-CPICH	P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		-60 (no test tolerance applied)	

Table 9.2.4CA.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.9 dB
1	PA3	10.8	5563
2	VA3	10.8	4347
3	PA3	6.8	3933
4	VA3	6.8	3011
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0)			

9.2.4D MIMO Performance - Fixed Reference Channel (FRC) H-Set 11A

9.2.4D.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 9 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 27-28 but not supporting Dual band operation.

9.2.4D.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 11A specified in Annex C.8.1.11, with the addition of the parameters in Table 9.2.4D.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4D.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4D.1: Test Parameters for Testing MIMO FRC H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4D.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.5 dB
1	PA3	18	9980
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.2.

9.2.4D.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4D.4 Method of test

9.2.4D.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters according to table 9.2.4D.1 and levels according to tables 9.2.4D.4 and 9.2.4D.5. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (the information bit payload block is 26504 bits for the primary block using 64QAM and 17568 bits for the secondary block using 16QAM. Hence the PRBS must be at least 26504 * 10 bits long for the primary block and 17568 * 10 bits for the secondary block.). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and clause D.2 on both the serving cells.

RADIO BEARER SETUP

Table 9.2.4D.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.2.4D.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4D.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by Table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 11A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. There are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (64QAM)	NACK on the Primary stream
ACK on the secondary stream (16QAM)	(26504 + 17568) bit per TTI	17568 bit per TTI
NACK on the secondary stream	26504 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.11

9.2.4D.5 Test Requirements

Tables 9.2.4D.4 and 9.2.4D.5 define the primary level settings including test tolerance and test parameters. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8D define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8D, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4D.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4D.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB)**	**T-put R (kbps) * HS-PDSCH** E_c/I_{or} **= -1.4dB**
1	PA3	18.8	9980
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

9.2.4DA MIMO Performance - Fixed Reference Channel (FRC) H-Set 11A for DB DC-HSDPA

9.2.4DA.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support DB-DC-HSDPA and HSDPA UE capability categories 27-28.

9.2.4DA.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 11A specified in Annex C.8.1.11, with the addition of the parameters in Table 9.2.4DA.1 and the downlink physical channel setup according to Table E.5.2. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4DA.2 with the downlink physical channel setup in Table E.5.2.

Table 9.2.4DA.1: Test Parameters for Testing MIMO FRC H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4DA.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.5 dB
1	PA3	18	9980
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.2.

9.2.4DA.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4DA.4 Method of test

9.2.4DA.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters according to Table 9.2.4DA.1 and levels according to tables 9.2.4DA.4 and 9.2.4DA.5. The primary and secondary serving cells are set on different bands according to DB-DC-HSDPA configurations defined in Section 4.2. The configuration of the downlink channels is defined in table E.5.2.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (the information bit payload block is 26504 bits for the primary block using 64QAM and 17568 bits for the secondary block using 16QAM. Hence the PRBS must be at least 26504 * 10 bits long for the primary block and 17568 * 10 bits for the secondary block.). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and clause D.2 on both the serving cells.

RADIO BEARER SETUP

Table 9.2.4DA.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.2.4DA.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4DA.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by Table E.5.9 and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 11A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. There are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (64QAM)	NACK on the Primary stream
ACK on the secondary stream (16QAM)	(26504 + 17568) bit per TTI	17568 bit per TTI
NACK on the secondary stream	26504 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.11

9.2.4DA.5 Test Requirements

Tables 9.2.4DA.4 and 9.2.4DA.5 define the primary level settings including test tolerance and test parameters. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8D define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Note that the levels in tables E.5.6 to E.5.8D, when applied in this subclause (MIMO performance) are equal to the sum of the levels at both antennas. They are equally divided between both antennas according to Table E.5.2: column Note.

Table 9.2.4DA.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4DA.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.2

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB)**	**T-put R (kbps) * HS-PDSCH** E_c/I_{or} **= -1.4dB**
1	PA3	18.8	9980
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

9.2.4E MIMO Performance - Fixed Reference Channel (FRC) H-Set 9 Asymmetric CPICHs

9.2.4E.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 15 - 18.

NOTE: This test case can be optionally tested for Rel-7 and onward UE's supporting MIMO feature.

9.2.4E.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 9A specified in Annex C.8.1.9, with the addition of the parameters in Table 9.2.4E.1 and the downlink physical channel setup according to Table E.5.4D. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for single transport block transmission shall be as follows: the reported preferred primary precoding vector shall be applied to the primary transport block.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4E.2 with the downlink physical channel setup in Table E.5.4D.

Table 9.2.4E.1: Test Parameters for Testing MIMO FRC H-Set 9

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/1		1/2	
PCI/CQI reporting Error Rate	%	0		0	
Number of transport blocks		2		1	
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK		Primary Transport Block: 16QAM Secondary Transport Block is not used.	

Table 9.2.4E.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9 with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -2 dB
1	PA3	10	5394
2	VA3	10	4344
3	PA3	6	3742
4	VA3	6	2926
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.1.

9.2.4E.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4E.4 Method of test

9.2.4E.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.22.
2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to Table 9.2.4E.1 and levels according to tables 9.2.4E.4 and 9.2.4E.5. The configuration of the downlink channels is defined in table E.5.4D.
3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 9 dual stream [tests 1 & 2]: The information bit payload block is 17568 bits for the primary block using 16QAM and 9736 bits for the secondary block using QPSK. Hence the PRBS must be at least 17568 * 10 bits long for the primary block and 9736 * 10 bits for the secondary block. Also. For fixed reference Channel Definition H-set 9 single stream [tests 3 & 4]: The information bit payload block, there is only one payload block size which is 17568 bits using 16QAM, hence the PRBS must be at least 17568 * 10 bits long for the single stream case). Use a PRBS from ITU-T O.153 Ref [27].
4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2.

Table 9.2.4E.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

9.2.4E.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.4E.3 and exceptions in Annex I, with levels according to table E.5.0.
2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by Table E.5.9. In addition, set the power offset for S-CPICH for MIMO to -3dB and start transmitting HSDPA Data.
3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-set 9 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and, for test 3 and 4, decide pass or fail according to Annex F.6.3 table F.6.3.5.4.10. ACK is counted as a success. NACK and statDTX are counted as a failure.
4. For test 1 and 2 there are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary stream	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.10

9.2.4E.5 Test Requirements

Tables 9.2.4E.4 and 9.2.4E.5 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Table 9.2.4E.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 9

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		Both P-CPICH S-CPICH	Both P-CPICH S-CPICH	Both P-CPICH S-CPICH	Both P-CPICH S-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)		-60 (no test tolerance applied)	

Table 9.2.4E.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 9 with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.9 dB
1	PA3	10.8	5394
2	VA3	10.8	4344
3	PA3	6.8	3742
4	VA3	6.8	2926
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9			

9.2.4F MIMO Performance - Fixed Reference Channel (FRC) H-Set 11 Asymmetric CPICHs

9.2.4F.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 19-20.

NOTE: This test case can be optionally tested for Rel-8 and onward UE's supporting MIMO feature.

9.2.4F.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 11 specified in Annex C.8.1.11, with the addition of the parameters in Table 9.2.4F.1 and the downlink physical channel setup according to Table E.5.4D. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4F.2 with the downlink physical channel setup in Table E.5.4D.

Table 9.2.4F.1: Test Parameters for Testing MIMO FRC H-Set 11

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4F.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 11 with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB)**	**T-put R (kbps) HS-PDSCH** E_c/I_{or} **= -1.5 dB**
1	PA3	18	9880

The reference for this requirement is TS 25.101 [1] clause 9.2.4.2.

9.2.4F.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4F.4 Method of test

9.2.4F.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.22.
2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters according to Table 9.2.4F.1 and levels according to tables 9.2.4F.4 and 9.2.4F.5. The configuration of the downlink channels is defined in table E.5.4D.
3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (the information bit payload block is 26504 bits for the primary block using 64QAM and 17568 bits for the secondary block using 16QAM. Hence the PRBS must be at least 26504 * 10 bits long for the primary block and 17568 * 10 bits for the secondary block.). Use a PRBS from ITU-T O.153 Ref [27].
4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2.

RADIO BEARER SETUP

Table 9.2.4F.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

9.2.4F.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.2.4F.3 and exceptions in Annex I, with levels according to table E.5.0.
2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by Table E.5.9. In addition, set the power offset for S-CPICH for MIMO to -3dB and start transmitting HSDPA Data.
3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-set 11 count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval. ACK is counted as a success. NACK and statDTX are counted as a failure.
4. There are 4 possible contributions to the throughput per TTI.

Primary stream **Secondary stream**	**ACK on the Primary stream (64QAM)**	**NACK on the Primary stream**
ACK on the secondary stream (16QAM)	(26504 + 17568) bit per TTI	17568 bit per TTI
NACK on the secondary stream	26504 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.7

9.2.4F.5 Test Requirements

Tables 9.2.4F.4 and 9.2.4F.5 define the primary level settings including test tolerance and test parameters. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8D define the secondary and subsequently ranked level settings including test tolerance. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Table 9.2.4F.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4F.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 11 with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) HS-PDSCH E_c/I_{or} = -1.4 dB
1	PA3	18.8	9880

9.2.4G MIMO Performance - Fixed Reference Channel (FRC) H-Set 9A Asymmetric CPICHs

9.2.4G.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 25 - 28.

NOTE: This test case can be optionally tested for Rel-9 and onward UE's supporting MIMO feature.

9.2.4G.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 9A specified in Annex C.8.1.9, with the addition of the parameters in Table 9.2.4G.1 and the downlink physical channel setup according to Table E.5.4D. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for single transport block transmission shall be as follows: the reported preferred primary precoding vector shall be applied to the primary transport block.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in table 9.2.4G.2 with the downlink physical channel setup in Table E.5.4D.

Table 9.2.4G.1: Test Parameters for Testing MIMO FRC H-Set 9A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/1		1/2	
PCI/CQI reporting Error Rate	%	0		0	
Number of transport blocks		2		1	
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK		Primary Transport Block: 16QAM Secondary Transport Block is not used.	

Table 9.2.4G.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -2 dB
1	PA3	10	5394
2	VA3	10	4344
3	PA3	6	3742
4	VA3	6	2926
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.1.

9.2.4G.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4G.4 Method of test

9.2.4G.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters for tests 1-4 according to table T.2.4G.1 and levels according to tables 9.2.4G.4 and 9.2.4G.5. The configuration of the downlink channels is defined in table E.5.4D.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-Set 9A dual stream [tests 1 & 2]: The information bit payload block is 17568 bits for the primary block using 16QAM and 9736 bits for the secondary block using QPSK. Hence the PRBS must be at least 17568 * 10 bits long for the primary block and 9736 * 10 bits for the secondary block. Also. For fixed reference Channel Definition H-Set 9A single stream [tests 3 & 4]: The information bit payload block, there is only one payload block size which is 17568 bits using 16QAM, hence the PRBS must be at least 17568 * 10 bits long for the single stream case). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and D.2.2.1C and clause D.2. on each of the serving cells.

Table 9.2.4G.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

9.2.4G.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4G.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8B as specified by Table E.5.9. In addition, set the power offset for S-CPICH for MIMO to -3dB and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 9A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and, for test 3 and 4, decide pass or fail according to Annex F.6.3 table F.6.3.5.4.9. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. For test 1 and 2 there are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary stream	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.10

9.2.4G.5 Test Requirements

Tables 9.2.4G.4 and 9.2.4G.5 define the primary level settings including test tolerance and test parameters for all relevant throughput tests. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8C define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Table 9.2.4G.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 9A

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/1		1/2	
PCI/CQI reporting Error Rate	%	0		0	
Number of transport blocks		2		1	
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK		Primary Transport Block: 16QAM Secondary Transport Block is not used.	

Table 9.2.4G.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 9A with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.9 dB
1	PA3	10.8	5394
2	VA3	10.8	4344
3	PA3	6.8	3742
4	VA3	6.8	2926
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 9 2) For Fixed Reference Channel (FRC) H-Set 9A the reference values for R should be scaled (multiplied by 2.0)			

9.2.4H MIMO Performance - Fixed Reference Channel (FRC) H-Set 11A Asymmetric CPICHs

Editor's note: This Test case is not complete. Message contents and distribution of P-CPICH and S-CPICH powers need clarification.

9.2.4H.1 Definition and applicability

The MIMO performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) in multi-path fading environments is determined by the information bit throughput R.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 27-28.

NOTE: This test case can be optionally tested for Rel-9 and onward UE's supporting MIMO feature.

9.2.4H.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 11A specified in Annex C.8.1.11, with the addition of the parameters in Table 9.2.4H.1 and the downlink physical channel setup according to Table E.5.4D. Precoding weight set restriction shall not be enabled.

The primary precoding vector signalled on the HS-SCCH and applied on the associated HS-DSCH subframe shall correspond to the preferred primary precoding vector reported immediately before the start of the HS-SCCH subframe.

The determination of applied precoding vector for two transport block transmission shall be as follows: If the CQI reported by the UE indicates a preference for a single transport block, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the primary transport block. If the CQI reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector does not correspond to the highest reported CQI value, the preferred primary precoding vector shall be applied to the secondary transport block.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in Table 9.2.4H.2 with the downlink physical channel setup in Table E.5.4D.

Table 9.2.4H.1: Test Parameters for Testing MIMO FRC H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4H.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps) * HS-PDSCH E_c/I_{or} = -1.5 dB
1	PA3	18	9880
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

The reference for this requirement is TS 25.101 [1] clause 9.2.4.2.

9.2.4H.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal, representing a multi-path fading channel with information bit throughput R not falling below a specified value. The test stresses the multi-code reception and channel decoding with incremental redundancy.

9.2.4H.4 Method of test

9.2.4H.4.1 Initial conditions

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

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

1. Connect the SS (Node B Emulator) and faders and AWGN noise sources to the UE antenna connectors as shown in figure A.40.

2. Set the node B emulator behaviour according to table 9.2.4. Set the test parameters according to Table 9.2.4H.1 and levels according to tables 9.2.4H.4 and 9.2.4H.5. The configuration of the downlink channels is defined in table E.5.4D.

3. The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (the information bit payload block is 26504 bits for the primary block using 64QAM and 17568 bits for the secondary block using 16QAM. Hence the PRBS must be at least 26504 * 10 bits long for the primary block and 17568 * 10 bits for the secondary block.). Use a PRBS from ITU-T O.153 Ref [27].

4. Setup the fading simulators with fading conditions as described in tables D.2.2.1A and clause D.2 on both the serving cells.

RADIO BEARER SETUP

Table 9.2.4H.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	Not Present

9.2.4H.4.2 Procedure

1. Set up a HSDPA with looping back 12.2kbps RMC connection according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.13 with the exceptions for information elements listed in table 9.2.4H.3 and exceptions in Annex I, with levels according to table E.5.0.

2. Once the HSDPA connection is setup, change levels according to Tables E.5.6 to E.5.8C as specified by Table E.5.9. In addition, set the power offset for S-CPICH for MIMO to -3dB and start transmitting HSDPA Data on both the serving cells. For secondary serving HS-DSCH cell only P-CPICH, HS-PDSCH and HS-SCCH are configured.

3. For all relevant propagation conditions, for all relevant Ioc levels, for all relevant Ec/Ior, for all relevant Îor/Ioc, for H-Set 11A count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval. ACK is counted as a success. NACK and statDTX are counted as a failure. Throughput shall be measured per cell and compared to requirements in these tables.

4. There are 4 possible contributions to the throughput per TTI.

Primary stream Secondary stream	ACK on the Primary stream (64QAM)	NACK on the Primary stream
ACK on the secondary stream (16QAM)	(26504 + 17568) bit per TTI	17568 bit per TTI
NACK on the secondary stream	26504 bit per TTI	0 bit per TTI (also counted in case of statDTX)

At the end of the test interval calculate the throughput for each cell and relate it to the nominal throughput. This is the relative throughput RT. Decide pass or fail according to Annex F.6.3 Table F.6.3.5.4.11

9.2.4H.5 Test Requirements

Tables 9.2.4H.4 and 9.2.4H.5 define the primary level settings including test tolerance and test parameters. The pass / fail decision for throughput is done according to Annex F.6.3.

Tables E.5.6 to E.5.8D define the secondary and subsequently ranked level settings including test tolerance for both the serving cells. As those level settings are not uniform for the throughput tests in this clause, Table E.5.9 indicates which levels are applied, when the primary level settings (Ec/Ior and Ior/Ioc) and propagation conditions (PA3, VA3) vary.

Table 9.2.4H.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11A

Parameter	Unit	Test 1
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset ($\tau_{DPCH,n}$)	Chip	0
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of HARQ transmission		4
MIMO N_cqi_typeA/M_cqi ratio		1/1
PCI/CQI reporting Error Rate	%	0
Number of transport blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4H.5: Test requirement MIMO Fixed Reference Channel (FRC) H-Set 11A with downlink physical channel setup in Table E.5.4D

Test Number	Propagation Conditions	Reference value	
		$\hat{I}_{or}/I_{oc}$ **(dB)**	**T-put R (kbps) * HS-PDSCH** E_c/I_{or} **= -1.4dB**
1	PA3	18.8	9880
* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)			

9.3 Reporting of Channel Quality Indicator

The propagation conditions for this subclause are defined in table D.2.2.1B for non-MIMO operation under fading conditions, in subclause D.2.9.1 for MIMO operation under single stream conditions, and in subclause D.2.9.2 for MIMO operation under dual stream conditions.

For the cases in this subclause where CQI reporting is evaluated under fading conditions or under MIMO single/dual stream conditions it is expected that the UE will not always detect the HS-SCCH, resulting in a DTX for the uplink ACK/NACK transmission. The downlink configuration for evaluating CQI performance does not use retransmission. Therefore any BLER calculations must exclude any packets where the UE may have attempted to combine data from more than one transmission due to having missed one or more new data indicators or initial transmissions in MIMO operation from lost HS-SCCH transmissions.

The implication of this situation is covered in the procedure for each test.

9.3.1 Single Link Performance - AWGN Propagation Conditions

9.3.1.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 5 for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 - 8, 11 and 12.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.1.2 Minimum requirements

For the parameters specified in Table 9.3.1.1, and using the downlink physical channels specified in table E.5.1 for HSDPA categories 1-8, 11 and 12 or in Table E.5.1A for other HSDPA categories the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH BLER using the transport format indicated by median CQI is less than or equal to 0.1, the BLER using the transport format indicated by the (median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER using the transport format indicated by the median CQI is greater than 0.1, the BLER using transport format indicated by (median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1	Test 2	Test 3
$\hat{I}_{or}/I_{oc}$	dB	0	5	10
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
HS-PDSCH E_c/I_{or}	dB	-3		
HS-SCCH_1 E_c/I_{or}	dB	-10		
DPCH E_c/I_{or}	dB	-10		
Maximum number of H-ARQ transmission	-	1		
Number of HS-SCCH set to be monitored	-	1		
CQI feedback cycle	ms	2		
CQI repetition factor	-	1		
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]. Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: UEs from capability categories 13-20 shall be configured in non64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.				

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.

9.3.1.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2.

9.3.1.4 Method of test

9.3.1.4.1 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 SS and an AWGN noise source to the UE antenna connector as shown in figure A.9.
2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0, and with the following exceptions in the RADIO BEARER SETUP message.

Table 9.3.1.2: Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark
Downlink HS-PDSCH Information	
- HS-SCCH Info	
- CHOICE mode	FDD
- DL Scrambling Code	
- HS-SCCH Channelisation Code Info	
- HS-SCCH Channelisation Code	2
- Measurement Feedback Info	
- CHOICE mode	FDD
- POhsdsch	Compatible with the values in table 9.3.1.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	
- Number of Processes	2
- Added or reconfigured MAC-d flow	
- MAC-hs queue to add or reconfigure list	(one queue)
- MAC-d PDU size Info	
- MAC-d PDU size	112 bits (Note 1)
- MAC-d PDU size index	0
- MAC-d PDU size	448 bits (Note 1)
- MAC-d PDU size index	1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

2) Set test conditions according to test 1 in table 9.3.1.1. The configuration of the downlink channels is defined in table E.5.1.

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

3) The SS shall send the TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

5) If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 7), otherwise goto step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK /ACK + NACK) ≥ 0.1

then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK / ACK + NACK) < 0.1

then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) Repeat the same procedure (steps 3 to 8) with test conditions according to the table 9.3.1.1 for Test 2 and Test 3.

9.3.1.5 Test Requirements

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

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1A Single Link Performance - AWGN Propagation Conditions, 64QAM

9.3.1A.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 7 for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13, 14, 17 and 18.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13, 14, 17, 18, 19 and 20.

9.3.1A.2 Minimum requirements

For the parameters specified in Table 9.3.1A.1, and using the downlink physical channels specified in table E.5.1A the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH BLER using the transport format indicated by median CQI is less than or equal to 0.1, the BLER using the transport format indicated by the (median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER using the transport format indicated by the median CQI is greater than 0.1, the BLER using transport format indicated by (median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1A.1: Test Parameters for CQI test in AWGN, 64QAM - single link

Parameter	Unit	Test 1
$\hat{I}_{or}/I_{oc}$	dB	15
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-PDSCH E_c/I_{or}	dB	-2
HS-SCCH_1 E_c/I_{or}	dB	-12
DPCH E_c/I_{or}	dB	-12
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in 64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.		

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.2.

9.3.1A.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2.

9.3.1A.4 Method of test

9.3.1A.4.1 Initial conditions

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

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

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

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1A.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0, and with the following exceptions.

Table 9.3.1A.2 Specific Message Contents for CQI test in AWGN, 64QAM - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list -Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark	Version
RAB information for setup list		
- RAB information for setup		
- RB mapping info		
- Downlink RLC logical channel info		
- Downlink transport channel type	HS-DSCH	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
- DL HS-DSCH MAC-ehs Queue Id	0	Rel-7
- Logical channel identity	1	
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- Measurement Feedback Info		
- CHOICE mode	FDD	
- POhsdsch	Compatible with the values in table 9.3.1A.1 and according to TS 25.214 [5] clause 6A.2	
- CHOICE mode	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
- Added or Reconfigured DL TrCH information		
- CHOICE DL parameters	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning	Explicit	
- Memory size	2	
- Process Memory Size	44000	
- Process Memory Size	44000	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
- Added or reconfigured MAC-ehs reordering queue		Rel-7
- MAC-ehs queue to add or reconfigure list	(one queue)	Rel-7
- MAC-ehs queue Id	0	Rel-7
- T1	50	Rel-7
- Treset	Not Present	Rel-7
- MAC-ehs window size	16	Rel-7
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
NOTE 1: MAC-d PDU size is flexible for every CQI value.		

2. Set test conditions according to test 1 in table 9.3.1A.1. The configuration of the downlink channels is defined in table E.5.1A.

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

3. The SS shall send the TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

5. If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

   For the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 7), otherwise goto step 8)

7. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

8. The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9.3.1A.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1A.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1B Single Link Performance - AWGN Propagation Conditions, DC-HSDPA requirements

9.3.1B.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for the FDD UE that support DC- HSDPA UE capability categories 21, 22, 23 and 24.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DC-HSDPA UE capability categories 25-28.

9.3.1B.2 Minimum requirements

For the parameters specified in Table 9.3.1B.1, and using the downlink physical channels specified in table E.5.1, with both primary and secondary cells configured, for each of the serving cells, the reported CQI value for the cell shall be in the range of +/-2 of the cell-specific reported median more than 90% of the time. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by cell-specific median CQI is less than or equal to 0.1, the BLER for this cell using the transport format indicated by the (cell-specific median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by the cell-specific median CQI is greater than 0.1, the BLER for this cell using transport format indicated by (cell-specific median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1B.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1
$\hat{I}_{or1} / I_{oc}$	dB	0
$\hat{I}_{or2} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-PDSCH E_c / I_{or}	dB	-3
HS-SCCH_1 E_c / I_{or}	dB	-10
DPCH E_c / I_{or}	dB	-10
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5] NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5] NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].		

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.3.

9.3.1B.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 on each of the serving cells is within the limits defined and that a BLER of 10% falls between the TF based on cell specific Median CQI-1 and the TF based on cell specific Median CQI TF or between the TF based on cell specific Median CQI and the TF based on cell specific Median CQI+2.

9.3.1B.4 Method of test

9.3.1B.4.1 Initial conditions

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

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

1. Connect the SS and an AWGN noise source to the UE antenna connector as shown in figure A.38.
2. Set Ack/Nack handling at the SS for each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1B.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.1B.2.

Table 9.3.1B.2: Specific Message Contents for CQI test in AWGN - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - Measurement Power Offset	 FDD 2 FDD Compatible with the values in table 9.3.1B.1 and according to TS 25.214 [5] clause 6A.2	
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - CHOICE Memory Partitioning - Process Memory Size - Process Memory Size	 HS-DSCH 2 Explicit The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3 The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- Measurement Power Offset	Compatible with the values in table 9.3.1B.1 and according to TS 25.214 [5] clause 6A.2	

2) Set test conditions according to test 1 in table 9.3.1B.1 for both serving HS-DSCH cell and the secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

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

3) The SS shall send the TF according to CQI value 16 on each of the serving HS-DSCH cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

4) Set up a relative frequency distribution for each of the reported cell specific CQI-values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value of that cell.

5) If 1800 or more of the cell specific CQI values are in the range (cell specific Median CQI - 2) ≤ (cell specific Median CQI) ≤ (cell specific Median CQI + 2) for each cell then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the cell specific median-CQI value on each of the cell and shall not react to the UE's composite CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses on each of the cell. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses on each of the cell reaches 1000.

Based on the ratio (NACK/ACK + NACK) for each of the cell, follow the below condition:

If (NACK/ACK+NACk) < 0.1 Goto step 7

Else Goto step 8

7) The SS shall transmit the TF according to the cell specific median-CQI+2 value and shall not react to the UE's composite CQIreports. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

If the ratio (NACK /ACK + NACK) ≥ 0.1

then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the cell specific median-CQI-1 value and shall not react to the UE's composite CQI value. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

If the ratio (NACK / ACK + NACK) < 0.1

then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) The test case is considered pass only if steps 5-8 are satisfied for both the cells.

9.3.1B.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1B.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1BA Single Link Performance - AWGN Propagation Conditions, DB-DC-HSDPA requirements

9.3.1BA.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DB-DC-HSDPA UE capability categories 21-28.

DB-DC-HSDPA is designed to operate in configurations specified in clause 4.2.

9.3.1BA.2 Minimum requirements

For the parameters specified in Table 9.3.1BA.1, and using the downlink physical channels specified in table E.5.1, with both primary and secondary cells configured, for each of the serving cells, the reported CQI value for the cell shall be in the range of +/-2 of the cell-specific reported median more than 90% of the time. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by cell-specific median CQI is less than or equal to 0.1, the BLER for this cell using the transport format indicated by the (cell-specific median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by the cell-specific median CQI is greater than 0.1, the BLER for this cell using transport format indicated by (cell-specific median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1BA.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1
$\hat{I}_{or1} / I_{oc}$	dB	0
$\hat{I}_{or2} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-PDSCH E_c / I_{or}	dB	-3
HS-SCCH_1 E_c / I_{or}	dB	-10
DPCH E_c / I_{or}	dB	-10
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5] NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5] NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].		

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.3.

9.3.1BA.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 on each of the serving cells is within the limits defined and that a BLER of 10% falls between the TF based on cell specific Median CQI -1 and the TF based on cell specific Median CQI TF or between the TF based on cell specific Median CQI and the TF based on cell specific Median CQI+2.

9.3.1BA.4 Method of test

9.3.1BA.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.38.

2. Set Ack/Nack handling at the SS for each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1BA.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.1BA.2.

Table 9.3.1BA.2: Specific Message Contents for CQI test in AWGN - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - Measurement Power Offset	 FDD 2 FDD Compatible with the values in table 9.3.1BA.1 and according to TS 25.214 [5] clause 6A.2	
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - CHOICE Memory Partitioning - Process Memory Size - Process Memory Size	 HS-DSCH 2 Explicit The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3 The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- Measurement Power Offset	Compatible with the values in table 9.3.1BA.1 and according to TS 25.214 [5] clause 6A.2	

2) Set test conditions according to test 1 in table 9.3.1BA.1 for both serving HS-DSCH cell and the secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for serving HS-DSCH cell, and for secondary serving HS-DSCH cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

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

3) The SS shall send the TF according to CQI value 16 on each of the serving HS-DSCH cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

4) Set up a relative frequency distribution for each of the reported cell specific CQI-values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value of that cell.

5) If 1800 or more of the cell specific CQI values are in the range (cell specific Median CQI - 2) ≤ (cell specific Median CQI) ≤ (cell specific Median CQI + 2) for each cell then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the cell specific median-CQI value on each of the cell and shall not react to the UE's composite CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses on each of the cell. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses on each of the cell reaches 1000.

Based on the ratio (NACK/ACK + NACK) for each of the cell, follow the below condition:

If (NACK/ACK+NACk) < 0.1 Goto step 7

Else Goto step 8

7) The SS shall transmit the TF according to the cell specific median-CQI+2 value and shall not react to the UE's composite CQIreports. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the cell specific median-CQI-1 value and shall not react to the UE's composite CQI value. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) The test case is considered pass only if steps 5-8 are satisfied for both the cells.

9.3.1BA.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1BA.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1BB Single Link Performance - AWGN Propagation Conditions, 4C-HSDPA requirements (3 Carriers)

9.3.1BB.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA UE capability categories 29 and 30.

9.3.1BB.2 Minimum requirements

For the parameters specified in Table 9.3.1BB.1, and using the downlink physical channels specified in table E.5.1, with both primary and secondary cells configured, for each of the serving cells, the reported CQI value for the cell shall be in the range of +/-2 of the cell-specific reported median more than 90% of the time. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by cell-specific median CQI is less than or equal to 0.1, the BLER for this cell using the transport format indicated by the (cell-specific median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by the cell-specific median CQI is greater than 0.1, the BLER for this cell using transport format indicated by (cell-specific median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1BB.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1
$\hat{I}_{or1} / I_{oc}$	dB	0
$\hat{I}_{or2} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-PDSCH E_c / I_{or}	dB	-3
HS-SCCH_1 E_c / I_{or}	dB	-10
DPCH E_c / I_{or}	dB	-10
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5] NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5] NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].		

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.3.

9.3.1BB.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 on each of the serving cells is within the limits defined and that a BLER of 10% falls between the TF based on cell specific Median CQI-1 and the TF based on cell specific Median CQI TF or between the TF based on cell specific Median CQI and the TF based on cell specific Median CQI+2.

9.3.1BB.4 Method of test

9.3.1BB.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.46.
2. Set Ack/Nack handling at the SS for each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1BB.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.1BB.2.

Table 9.3.1BB.2: Specific Message Contents for CQI test in AWGN - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	7	

2) Set test conditions according to test 1 in table 9.3.1BB.1 for both serving HS-DSCH cell and the secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1 for serving HS-DSCH cell, and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

NOTE 1: The following part of the procedure will test if the UE reports a limited range of CQI values under the predefined channel conditions.

3) The SS shall send the TF according to CQI value 16 on each of the serving HS-DSCH cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

4) Set up a relative frequency distribution for each of the reported cell specific CQI-values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value of that cell.

5) If 1800 or more of the cell specific CQI values are in the range (cell specific Median CQI - 2) ≤ (cell specific Median CQI) ≤ (cell specific Median CQI + 2) for each cell then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the cell specific median-CQI value on each of the cell and shall not react to the UE's composite CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses on each of the cell. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses on each of the cell reaches 1000.

Based on the ratio (NACK/ACK + NACK) for each of the cell, follow the below condition:

If (NACK/ACK+NACk) < 0.1 Goto step 7

Else Goto step 8

7) The SS shall transmit the TF according to the cell specific median-CQI+2 value and shall not react to the UE's composite CQIreports. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the cell specific median-CQI-1 value and shall not react to the UE's composite CQI value. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE 2: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between
[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]
is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) The test case is considered pass only if steps 5-8 are satisfied for all 3 cells.

9.3.1BB.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1BB.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1BC Single Link Performance - AWGN Propagation Conditions, 4C-HSDPA requirements

9.3.1BC.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA UE capability categories 31 and 32.

9.3.1BC.2 Minimum requirements

For the parameters specified in Table 9.3.1BC.1, and using the downlink physical channels specified in table E.5.1, with both primary and secondary cells configured, for each of the serving cells, the reported CQI value for the cell shall be in the range of +/-2 of the cell-specific reported median more than 90% of the time. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by cell-specific median CQI is less than or equal to 0.1, the BLER for this cell using the transport format indicated by the (cell-specific median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by the cell-specific median CQI is greater than 0.1, the BLER for this cell using transport format indicated by (cell-specific median CQI -1) shall be less than or equal to 0.1.

Table 9.3.1BC.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1
$\hat{I}_{or1} / I_{oc}$	dB	0
$\hat{I}_{or2} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-PDSCH E_c / I_{or}	dB	-3
HS-SCCH_1 E_c / I_{or}	dB	-10
DPCH E_c / I_{or}	dB	-10
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5] NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5] NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].		

The reference for this requirement is TS 25.101 [1] clause 9.3.1.1.3.

9.3.1BC.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 on each of the serving cells is within the limits defined and that a BLER of 10% falls between the TF based on cell specific Median CQI -1 and the TF based on cell specific Median CQI TF or between the TF based on cell specific Median CQI and the TF based on cell specific Median CQI+2.

9.3.1BC.4 Method of test

9.3.1BC.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.46.
2. Set Ack/Nack handling at the SS for each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1BC.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.1BC.2.

Table 9.3.1BC.2: Specific Message Contents for CQI test in AWGN - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

2) Set test conditions according to test 1 in table 9.3.1BC.1 for both serving HS-DSCH cell and the secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1 for serving HS-DSCH cell, and for secondary serving HS-DSCH cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

NOTE 1: The following part of the procedure will test if the UE reports a limited range of CQI values under the predefined channel conditions.

3) The SS shall send the TF according to CQI value 16 on each of the serving HS-DSCH cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.
4) Set up a relative frequency distribution for each of the reported cell specific CQI-values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value of that cell.
5) If 1800 or more of the cell specific CQI values are in the range (cell specific Median CQI - 2) ≤ (cell specific Median CQI) ≤ (cell specific Median CQI + 2) for each cell then continue with step 6), otherwise fail the UE.

NOTE 2: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the cell specific median-CQI value on each of the cell and shall not react to the UE's composite CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses on each of the cell. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses on each of the cell reaches 1000.

Based on the ratio (NACK/ACK + NACK) for each of the cell, follow the below condition:

If (NACK/ACK+NACk) < 0.1 Goto step 7

Else Goto step 8

7) The SS shall transmit the TF according to the cell specific median-CQI+2 value and shall not react to the UE's composite CQIreports. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the cell specific median-CQI-1 value and shall not react to the UE's composite CQI value. For any HSDPA block, transmitted by the SS on any of the serving cell, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered for that cell.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE 3: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between
[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]
is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) The test case is considered pass only if steps 5-8 are satisfied for all 4 cells.

9.3.1BC.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1BC.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.2AB Single Link Performance - Fading Propagation Conditions, 4C-HSDPA requirements(3 Carriers)

9.3.2AB.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA UE capability categories 29 and 30.

9.3.2AB.2 Minimum requirements

For the parameters specified in Table 9.3.2AB.1 and using the downlink physical channels specified in table E.5.1, with both primary and secondary serving cells configured, for each of the serving cells, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a cell specific fixed transport format given by the cell specific CQI median as shown in Table 9.3.2AB.2. The BLER at a particular reported CQI for a specific serving cell is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe transmitted from this serving cell overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2AB.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5]. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5]. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/ non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2AB.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.3.

9.3.2AB.3 Test purpose

To verify that when using the TF based on the cell specific Median CQI the BLER for blocks associated with composite CQI reports of cell specific Median CQI is ≤ 60% and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is ≤ 15%.

9.3.2AB.4 Method of test

9.3.2AB.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.46.

2) Set Ack/Nack handling at the SS on each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2AB.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.2AB.3.

2) Set test conditions according to test 1 in table 9.3.2AB.1 on both the serving HS-DSCH cell and the secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1 for serving S_DSCH cell. For secondary serving cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Table 9.3.2AB.3: Specific Message Contents for CQI test in fading - single link

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (4C-HSDPA)

FFS

2) The SS shall send TF according to CQI value 16 on each of the serving cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

3) Set up a relative frequency distribution for each of the cell specific reported CQI values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that serving cell.

4) The SS shall transmit the TF according to the cell specific median-CQI value and shall not react to the UE's reported CQI value on each cell. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses on each cell, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2AB.4 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses for each serving cell with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER ≤ 15%

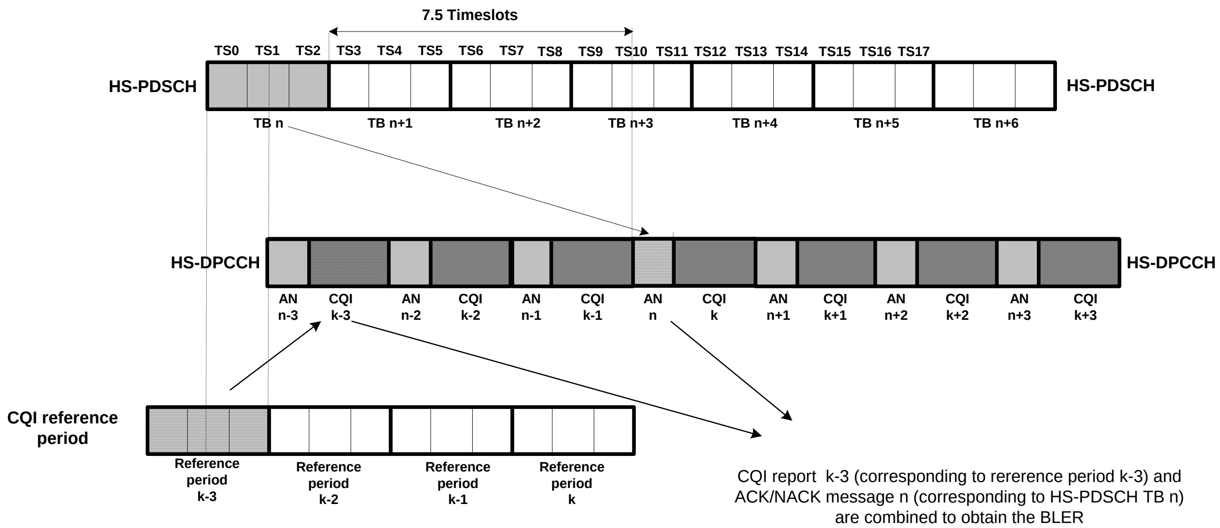

Figure 9.3.2AB.4: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.2AB.1.

9.3.2AB.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2AB.2 for each of the serving cells.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.2AC Single Link Performance - Fading Propagation Conditions, 4C-HSDPA requirements

9.3.2AC.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 10 and later releases to all types of UTRA for the FDD UE that support 4C-HSDPA UE capability categories 31 and 32.

9.3.2AC.2 Minimum requirements

For the parameters specified in Table 9.3.2AC.1 and using the downlink physical channels specified in table E.5.1, with both primary and secondary serving cells configured, for each of the serving cells, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a cell specific fixed transport format given by the cell specific CQI median as shown in Table 9.3.2AC.2. The BLER at a particular reported CQI for a specific serving cell is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe transmitted from this serving cell overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2AC.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5]. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5]. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/ non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2AC.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.3.

9.3.2AC.3 Test purpose

To verify that when using the TF based on the cell specific Median CQI the BLER for blocks associated with composite CQI reports of cell specific Median CQI is ≤ 60% and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is ≤ 15%.

9.3.2AC.4 Method of test

9.3.2AC.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.46.

2) Set Ack/Nack handling at the SS on each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2AC.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.16 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.2AC.3.

2) Set test conditions according to test 1 in table 9.3.2AC.1 on both the serving HS-DSCH cell and the secondary serving HS-DSCH cells. The configuration of the downlink channels is defined in table E.5.1 for serving S_DSCH cell. For secondary serving cells set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

Table 9.3.2AC.3: Specific Message Contents for CQI test in fading - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (4C-HSDPA)

FFS

3) The SS shall send TF according to CQI value 16 on each of the serving cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

4) Set up a relative frequency distribution for each of the cell specific reported CQI values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that serving cell.

5) The SS shall transmit the TF according to the cell specific median-CQI value and shall not react to the UE's reported CQI value on each cell. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses on each cell, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2AC.4 below.)
The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses for each serving cell with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

6) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER ≤ 15%

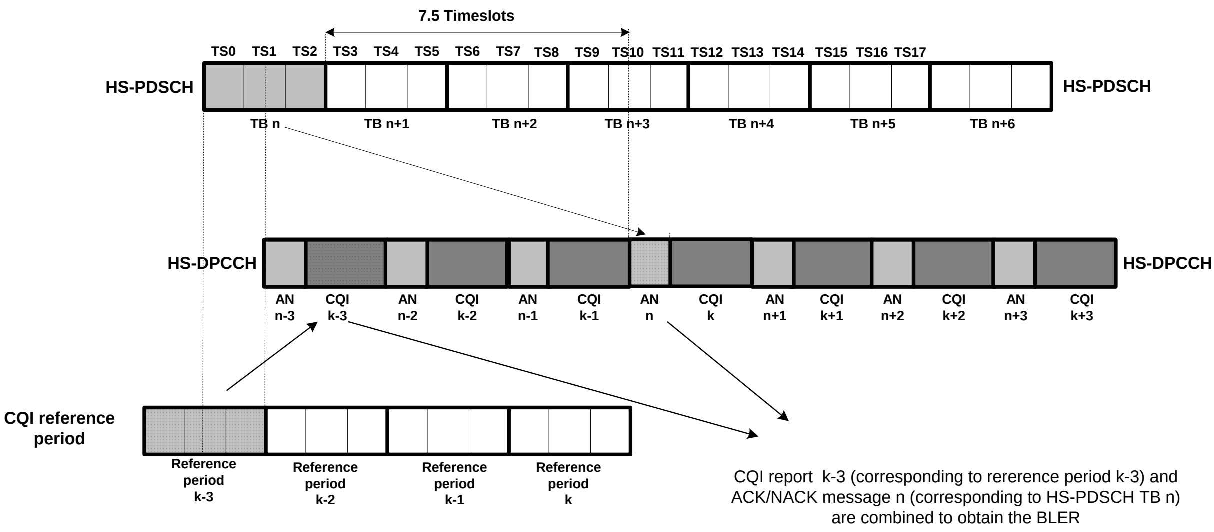

Figure 9.3.2AC.4: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.2AC.1.

9.3.2AC.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2AC.2 for each of the serving cells.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.1C Single Link Performance - AWGN Propagation Conditions, Periodically Varying Radio Conditions

- *Editor's note: Applicability statement in 34.121-2 to be added*

9.3.1C.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) when subject to AWGN propagation conditions with periodically varying radio conditions, is determined by the reporting variance.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 20.

9.3.1C.2 Minimum requirements

The reporting accuracy of the channel quality indicator (CQI) when subject to AWGN propagation conditions with periodically varying $\hat{I}_{or}/I_{oc}$, is determined by the reporting variance, as measured during selected parts of a predetermined $\hat{I}_{or}/I_{oc}$ pattern, as depicted in Figure 9.3.1C.1.

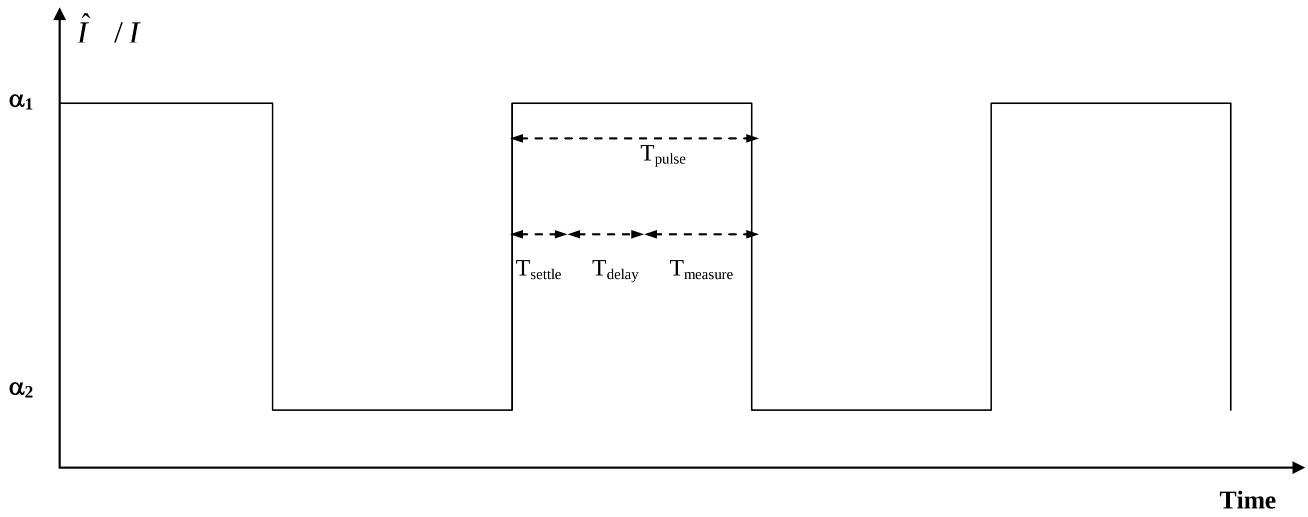

Figure 9.3.1C.1 Test scenario for CQI reporting test under varying interference conditions. $\hat{I}_{or}/I_{oc}$ is varied between α1 and α2 according to a predetermined square wave pattern.

For the parameters specified in Table 9.3.1C.1, and using the downlink physical channels specified in table E.5.1 for HSDPA categories 1-8, 11 and 12 or in Table E.5.1A for other HSDPA categories, let M_1 be defined as the median CQI that the UE reports in static propagation conditions, with Ior/Ioc set to α_1, and M_2 be the median CQI that the UE reports in static propagation conditions, with $\hat{I}_{or}/I_{oc}$ set to α_2. The minimum difference between M_1 and M_2 is required to be larger than 6.

For the parameters specified in Table 9.3.1C.1, and using the downlink physical channels specified in table E.5.1 for HSDPA categories 1-8, 11 and 12 or in Table E.5.1A for other HSDPA categories, 90% of the reported CQI values, during $T_{measure}$ as depicted in Figure 9.3.1C.1, shall be in the range of +/-3 of M1, for the cases when $T_{measure}$ occurs during time-periods where $\hat{I}_{or}/I_{oc}$ is set to $\alpha_{1,}$ and in the range of +/-3 of M2, for the cases when $T_{measure}$ occurs during time-periods where $\hat{I}_{or}/I_{oc}$ is set to α_2 .

The measurement equipment is allowed to start the ramping of $\hat{I}_{or}/I_{oc}$ 13 slots before the start of the HS-DPCCH slot that contains the first CQI report in $T_{measure}$.

The measurement equipment shall have settled $\hat{I}_{or}/I_{oc}$ to its nominal value 10 slots before the start of the HS-DPCCH slot that contains the first CQI report in $T_{measure}$.

An illustration of these timing relations is provided in Figure 9.3.1C.2.

Table 9.3.1C.1: Test Parameter for CQI test in periodically varying radio conditions - single link

Parameter	Unit	Test 1
α_1	dB	10
α_2	dB	0
I_{oc1}	dBm/3.84 MHz	-60
I_{oc2}	dBm/3.84 MHz	-50
Phase reference	-	P-CPICH
$T_{measure}$	TTI	8
T_{delay}	TTI	3
T_{settle}	TTI	1
T_{pulse}	TTI	12
HS-PDSCH E_c/I_{or}	dB	-2
HS-SCCH_1 E_c/I_{or}	dB	-10
DPCH E_c/I_{or}	dB	-10
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.		

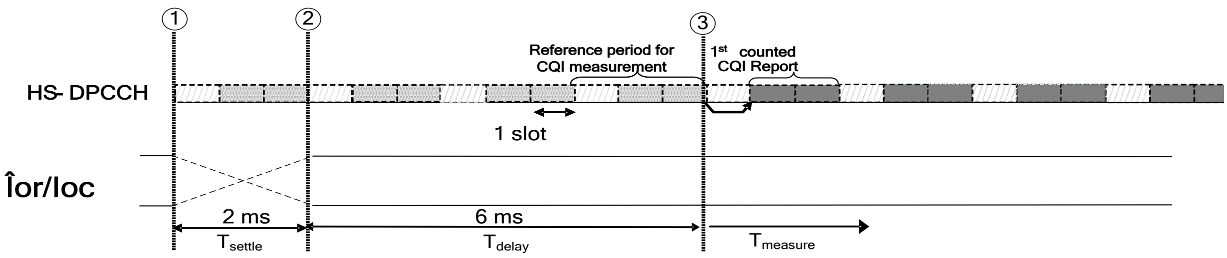

Figure 9.3.1C.2 Timing relation between HS-DPCCH, DPCCH/DPDCH and $\hat{I}_{or}/I_{oc}$ ramping. The measurement equipment starts ramping the $\hat{I}_{or}/I_{oc}$ at point 1. The $\hat{I}_{or}/I_{oc}$ should be settled to its nominal value at point 2. The first CQI report that is counted in the statistics of the requirement is transmitted in the uplink at point 3.

The reference for this requirement is TS 25.101 [1] clause 9.3.1.3.1

9.3.1C.3 Test purpose

To verify that the variance of the CQI reports is within the limits defined and that the difference between the average reported CQI values, for two different $\hat{I}_{or}/I_{oc}$, is within the defined limit.

9.3.1C.4 Method of test

9.3.1C.4.1 Initial conditions

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

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

1. Connect SS and an AWGN noise source to the UE antenna connector as shown in figure A.9.
2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.1C.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0, and with the following exceptions in the RADIO BEARER SETUP message.

Table 9.3.1C.2 Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark
Downlink HS-PDSCH Information	
- HS-SCCH Info	
- CHOICE mode	FDD
- DL Scrambling Code	
- HS-SCCH Channelisation Code Info	
- HS-SCCH Channelisation Code	2
- Measurement Feedback Info	
- CHOICE mode	FDD
- POhsdsch	Compatible with the values in table 9.3.1C.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	
- Number of Processes	2
- Added or reconfigured MAC-d flow	
- MAC-hs queue to add or reconfigure list	(one queue)
- MAC-d PDU size Info	
- MAC-d PDU size	112 bits (Note 1)
- MAC-d PDU size index	0
- MAC-d PDU size	448 bits (Note 1)
- MAC-d PDU size index	1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

2) Set test conditions according to test 1 in table 9.3.1C.1. The configuration of the downlink channels is defined in table E.5.1. Every 24 ms the SS shall toggle the I_{oc} level between I_{oc1} and I_{oc2}.

3) The SS shall send the TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE.

4) Wait for one second and then start to gather CQI reports during continuous transmission of the HS-PDSCH. In this process the SS collects chunks of 8 consecutive CQI reports ($T_{measure}$), starting with the sub frame occurring 8 ms after a change of I_{oc} level, according to figure 9.3.1C.2. All other CQI reports ($T_{settle} + T_{delay}$) will be discarded. Cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports. The collected CQI pattern would be "…OOOOHHHHHHHHOOOOLLLLLLLLOOOO…", where "O" indicates discarded CQI reports, "H" indicates CQI reports corresponding to high $\hat{I}_{or}/I_{oc}$ and "L" indicates CQI reports corresponding to low $\hat{I}_{or}/I_{oc}$. Stop when 4000 reports have been gathered.

5) Set up a relative frequency distribution for the collected CQI-values, belonging to the I_{oc1} value. Calculate the median CQI value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value, M_1.

6) Set up a relative frequency distribution for the collected CQI-values, belonging to the I_{oc2} value. Calculate the median CQI value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value, M_2.

7) If 1800 or more of the collected CQI values, reported for I_{oc1}, are in the range (Median CQI M_1 - 3) ≤ Median CQI ≤ (Median CQI M_1 + 3) then continue with step 8), otherwise fail the UE.

8) If 1800 or more of the CQI values, reported for I_{oc2}, are in the range (Median CQI M_2 - 3) ≤ Median CQI ≤ (Median CQI M_2 + 3) then continue with step 9), otherwise fail the UE.

9) If the difference between M_1 and M_2 is greater than 6-TT=5 then pass the UE, otherwise fail the UE.

9.3.1C.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.1C.4.2.

9.3.2 Single Link Performance - Fading Propagation Conditions

9.3.2.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 5 for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 - 8, 11 and 12.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.2.2 Minimum requirements

For the parameters specified in Table 9.3.2.1, and using the downlink physical channels specified in table E.5.1, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.2.2. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: UEs from capability categories 13-20 shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.			

Table 9.3.2.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.

9.3.2.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.2.4 Method of test

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

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0, and with the following exceptions in the RADIO BEARER SETUP message. Set test conditions according to test 1 in table 9.3.2.1. The configuration of the downlink channels is defined in table E.5.1.

Table 9.3.2.3 Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark
Downlink HS-PDSCH Information	
- HS-SCCH Info	
- CHOICE mode	FDD
- DL Scrambling Code	
- HS-SCCH Channelisation Code Info	
- HS-SCCH Channelisation Code	2
- Measurement Feedback Info	
- CHOICE mode	FDD
- POhsdsch	Compatible with the values in table 9.3.2.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	
- Number of Processes	2
- Added or reconfigured MAC-d flow	
- MAC-hs queue to add or reconfigure list	(one queue)
- MAC-d PDU size Info	
- MAC-d PDU size	112 bits (Note 1)
- MAC-d PDU size index	0
- MAC-d PDU size	448 bits (Note 1)
- MAC-d PDU size index	1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

2) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

4) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER $\leq$ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

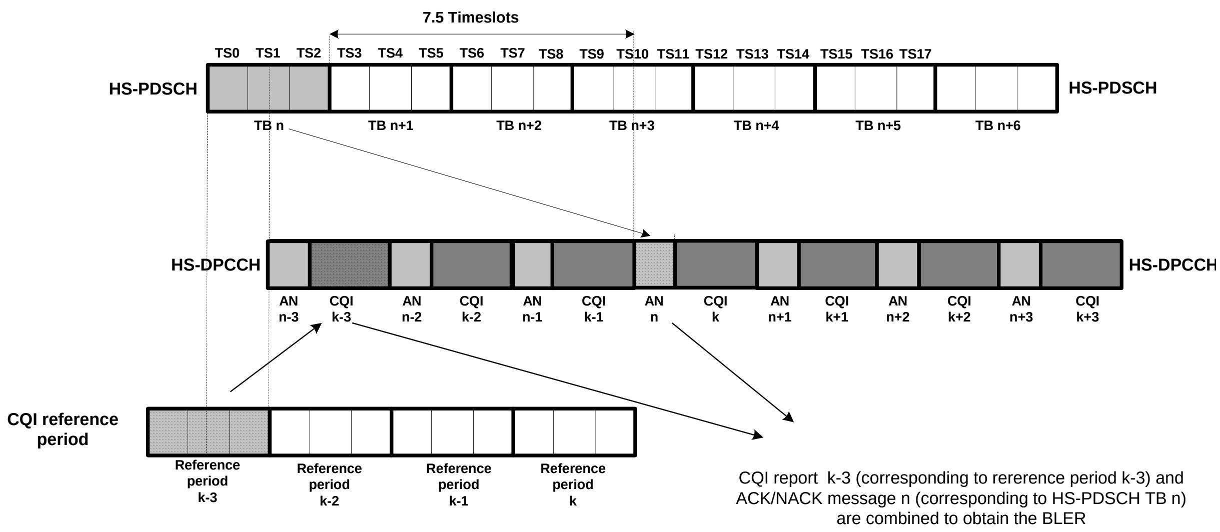

Figure 9.3.2.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.2.1.

9.3.2.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.2A Single Link Performance - Fading Propagation Conditions, DC-HSDPA requirements

9.3.2A.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for the FDD UE that support DC- HSDPA UE capability categories 21, 22, 23 and 24.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DC-HSDPA UE capability categories 25-28.

9.3.2A.2 Minimum requirements

For the parameters specified in Table 9.3.2A.1 and using the downlink physical channels specified in table E.5.1, with both primary and secondary serving cells configured, for each of the serving cells, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a cell specific fixed transport format given by the cell specific CQI median as shown in Table 9.3.2A.2. The BLER at a particular reported CQI for a specific serving cell is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe transmitted from this serving cell overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2A.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5]. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5]. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/ non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2A.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	**Test2**
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.

9.3.2A.3 Test purpose

To verify that when using the TF based on the cell specific Median CQI the BLER for blocks associated with composite CQI reports of cell specific Median CQI is ≤ 60% and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is ≤ 15%.

9.3.2A.4 Method of test

9.3.2A.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.36.

2) Set Ack/Nack handling at the SS on each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2A.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.2A.3.

2) Set test conditions according to test 1 in table 9.3.2A.1 on both the serving HS-DSCH cell and the secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for serving S_DSCH cell. For secondary serving cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

Table 9.3.2A.3: Specific Message Contents for CQI test in fading - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - Measurement Power Offset	 FDD 2 FDD Compatible with the values in table 9.3.2A.1 and according to TS 25.214 [5] clause 6A.2	
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - CHOICE Memory Partitioning - Process Memory Size - Process Memory Size	 HS-DSCH 2 Explicit The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3 The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- Measurement Power Offset	Compatible with the values in table 9.3.2A.1 and according to TS 25.214 [5] clause 6A.2	

2) The SS shall send TF according to CQI value 16 on each of the serving cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

3) Set up a relative frequency distribution for each of the cell specific reported CQI values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that serving cell.

4) The SS shall transmit the TF according to the cell specific median-CQI value and shall not react to the UE's reported CQI value on each cell. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses on each cell, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2A.4 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses for each serving cell with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER ≤ 15%

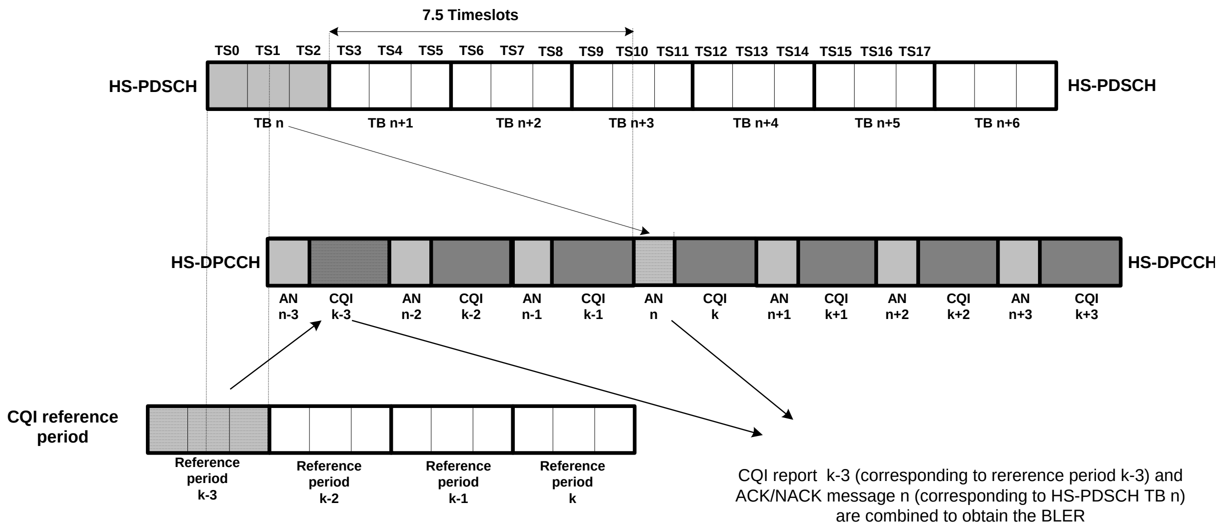

Figure 9.3.2A.4: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.2A.1.

9.3.2A.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2A.2 for each of the serving cells.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.2AA Single Link Performance - Fading Propagation Conditions, DB-DC-HSDPA requirements

9.3.2AA.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply for Release 9 and later releases to all types of UTRA for the FDD UE that support DB-DC-HSDPA UE capability categories 21-28.

DB-DC-HSDPA is designed to operate in configurations specified in clause 4.2.

9.3.2AA.2 Minimum requirements

For the parameters specified in Table 9.3.2AA.1 and using the downlink physical channels specified in table E.5.1, with both primary and secondary serving cells configured, for each of the serving cells, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a cell specific fixed transport format given by the cell specific CQI median as shown in Table 9.3.2AA.2. The BLER at a particular reported CQI for a specific serving cell is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe transmitted from this serving cell overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2AA.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 [5]. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 [5]. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/ non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2AA.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.

9.3.2AA.3 Test purpose

To verify that when using the TF based on the cell specific Median CQI the BLER for blocks associated with composite CQI reports of cell specific Median CQI is ≤ 60% and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is ≤ 15%.

9.3.2AA.4 Method of test

9.3.2AA.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.36.

2) Set Ack/Nack handling at the SS on each cell such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2AA.4.2 Procedure

1) Set up an HSDPA call according to TS 34.108 [3] clause 7.3.13 with levels according to table E.5.0, and with the exceptions for information elements listed in table 9.3.2AA.3.

2) Set test conditions according to test 1 in table 9.3.2AA.1 on both the serving HS-DSCH cell and the secondary serving HS-DSCH cell. The configuration of the downlink channels is defined in table E.5.1 for serving S_DSCH cell. For secondary serving cell set up P-CPICH, HS-PDSCH and HS-SCCH channels only per table E.5.1.

Table 9.3.2AA.3: Specific Message Contents for CQI test in fading - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list - Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - Measurement Power Offset	 FDD 2 FDD Compatible with the values in table 9.3.2AA.1 and according to TS 25.214 [5] clause 6A.2	
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - CHOICE Memory Partitioning - Process Memory Size - Process Memory Size	 HS-DSCH 2 Explicit The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3 The value of N_{IR} of CQI table specified according to TS 25.214 [5] clause 6A.2.3	
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- Measurement Power Offset	Compatible with the values in table 9.3.2AA.1 and according to TS 25.214 [5] clause 6A.2	

2) The SS shall send TF according to CQI value 16 on each of the serving cell and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 composite CQI reports have been gathered. In this process the SS collects composite CQI reports every 2 ms.

3) Set up a relative frequency distribution for each of the cell specific reported CQI values. Calculate the cell specific median value for each cell (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that serving cell.

4) The SS shall transmit the TF according to the cell specific median-CQI value and shall not react to the UE's reported CQI value on each cell. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses on each cell, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2AA.4 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses for each serving cell with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER ≤ 15%

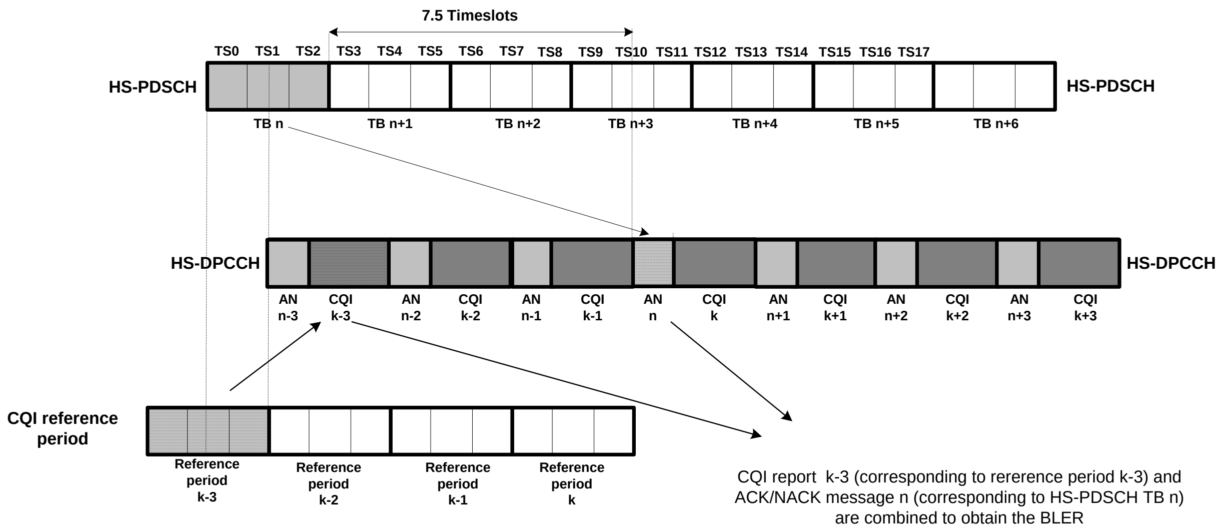

Figure 9.3.2AA.4: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.2AA.1.

9.3.2AA.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2AA.2 for each of the serving cells.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.2B Single Link Performance - Fading Propagation Conditions, 64QAM

9.3.2B.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 7 for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13, 14, 17 and 18.

The requirements and this test apply to Release 8 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13, 14, 17, 18, 19 and 20.

9.3.2B.2 Minimum requirements

For the parameters specified in Table 9.3.2B.1, and using the downlink physical channels specified in table E.5.1A, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.2B.2. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.2B.1: Test Parameters for CQI test in fading, 64QAM - single link

Parameter	Unit	Test 1
HS-PDSCH E_c/I_{or}	dB	-2
$\hat{I}_{or}/I_{oc}$	dB	15
I_{OC}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH
HS-SCCH_1 E_c/I_{or}	dB	-12
DPCH E_c/I_{or}	dB	-12
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		Case 8
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]. NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in 64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.2B.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 3	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.1.2.2.

9.3.2B.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.2B.4 Method of test

9.3.2B.4.1 Initial conditions

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

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

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

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.2B.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0, and with the following exceptions in the RRC CONNECTION SETUP and RADIO BEARER SETUP messages.

Table 9.3.2B.3 Specific Message Contents for CQI test in Fading, 64QAM - single link

Contents of RRC CONNECTION SETUP message: UM (Transition to CELL_DCH)

Information Element	Value/remark	Version
Downlink information for per radio links list -Downlink information for each radio links - Downlink DPCH info for each RL - DL channelisation code - Code number	 14	

Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list - Downlink information for each radio link - Downlink DPCH info for each RL - DL channelisation code - Code number	 7	

Contents of RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/Remark	Version
RAB information for setup list		
- RAB information for setup		
- RB mapping info		
- Downlink RLC logical channel info		
- Downlink transport channel type	HS-DSCH	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
- DL HS-DSCH MAC-ehs Queue Id	0	Rel-7
- Logical channel identity	1	
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- Measurement Feedback Info		
- CHOICE mode	FDD	
- POhsdsch	Compatible with the values in table 9.3.2B.1 and according to TS 25.214 [5] clause 6A.2	
- CHOICE mode	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
- Added or Reconfigured DL TrCH information		
- CHOICE DL parameters	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning	Explicit	
- Memory size	2	
- Process Memory Size	44000	
- Process Memory Size	44000	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
- Added or reconfigured MAC-ehs reordering queue		Rel-7
- MAC-ehs queue to add or reconfigure list	(one queue)	Rel-7
- MAC-ehs queue Id	0	Rel-7
- T1	50	Rel-7
- Treset	Not Present	Rel-7
- MAC-ehs window size	16	Rel-7
Downlink information per radio link list		
- Downlink information for each radio link		
- Downlink DPCH info for each RL		
- DL channelisation code		
- Code number	7	
NOTE 1: MAC-d PDU size is flexible for every CQI value.		

2) Set test conditions according to test 1 in table 9.3.2B.1. The configuration of the downlink channels is defined in table E.5.1A.

3) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

5) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.2B.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

6) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

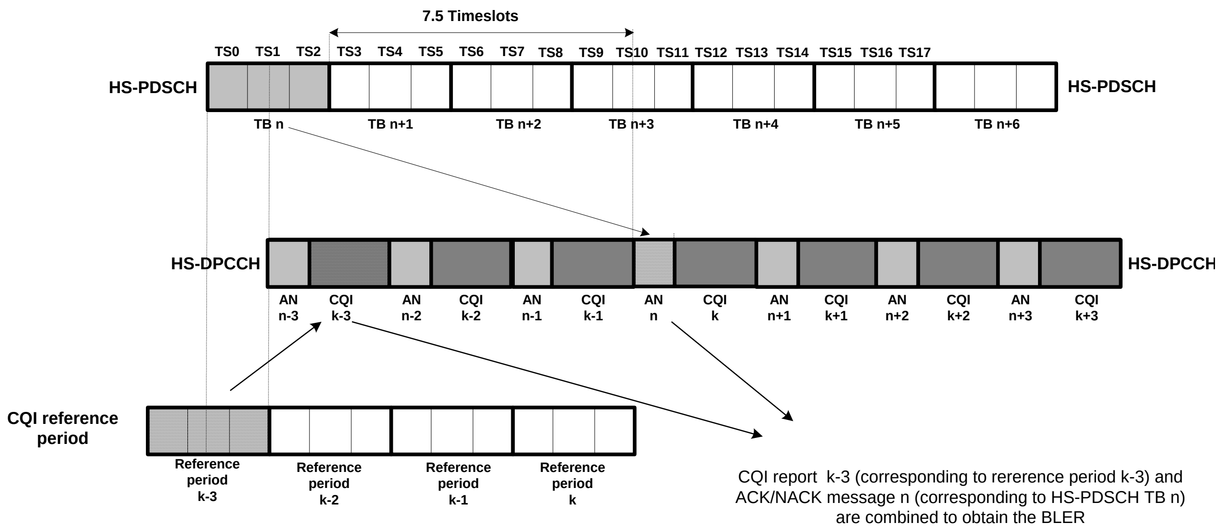

Figure 9.3.2B.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of samples R1 and R2 the BLER = (NACK) / (ACK + NACK)

9.3.2B.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.2B.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.3 Open Loop Diversity Performance - AWGN Propagation Conditions

9.3.3.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.3.2 Minimum requirements

For the parameters specified in Table 9.3.3.1, and using the downlink physical channels specified in table E.5.2 the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH BLER using the transport format indicated by median CQI is less than or equal to 0.1, the BLER using the transport format indicated by the (median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER using the transport format indicated by the median CQI is greater than 0.1, the BLER using transport format indicated by (median CQI -1) shall be less than or equal to 0.1.

Table 9.3.3.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1	Test 2	Test 3
$\hat{I}_{or}/I_{oc}$	dB	0	5	10
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
HS-PDSCH E_c/I_{or}	dB	-3		
HS-SCCH_1 E_c/I_{or}	dB	-10		
DPCH E_c/I_{or}	dB	-10		
Maximum number of H-ARQ transmission	-	1		
Number of HS-SCCH set to be monitored	-	1		
CQI feedback cycle	ms	2		
CQI repetition factor	-	1		
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]. Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.				

The reference for this requirement is TS 25.101 [1] clause 9.3.2.1.

9.3.3.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2.

9.3.3.4 Method of test

9.3.3.4.1 Initial conditions

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

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

1. Connect SS and an AWGN noise source to the UE antenna connector as shown in figure A.12a.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.3.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.3.2, with levels according to table E.5.0.

2) Set test conditions according to test 1 according table 9.3.3.1. The configuration of the downlink channels is defined in table E.5.2.

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

3) The SS shall send the TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

5) If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 7), otherwise goto step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK /ACK + NACK) ≥ 0.1

then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK / ACK + NACK) < 0.1

then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) Repeat the same procedure (steps 3 to 8) with test conditions according to the table 9.3.3.1 for Test 2 and Test 3.

Table 9.3.3.2: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1

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

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - POhsdsch	 FDD 2 FDD Compatible with the values in table 9.3.3.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - Added or reconfigured MAC-d flow - MAC-hs queue to add or reconfigure list - MAC-d PDU size Info - MAC-d PDU size	 HS-DSCH 2 (one queue) 112 bits (Note 1)
- MAC-d PDU size index	0
- MAC-d PDU size	448 bits (Note 1)
- MAC-d PDU size index	1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	 FDD STTD
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	 FDD 1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

9.3.3.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.3.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.4 Open Loop Diversity Performance - Fading Propagation Conditions

9.3.4.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.4.2 Minimum requirements

For the parameters specified in Table 9.3.4.1, and using the downlink physical channels specified in table E.5.2, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.4.2.. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.4.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c/I_{or}	dB	-8	-4
$\hat{I}_{or}/I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c/I_{or}	dB	-8.5	
DPCH E_c/I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.			

Table 9.3.4.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.2.2.

9.3.4.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.4.4 Method of test

9.3.4.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.12.

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

3) Setup the fading simulators with fading conditions as described in table D.2.2.1B and clause D.2.7.

9.3.4.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.4.3, with levels according to table E.5.0. Set test conditions according to test 1 according table 9.3.4.1. The configuration of the downlink channels is defined in table E.5.2.

2) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

4) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.4.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

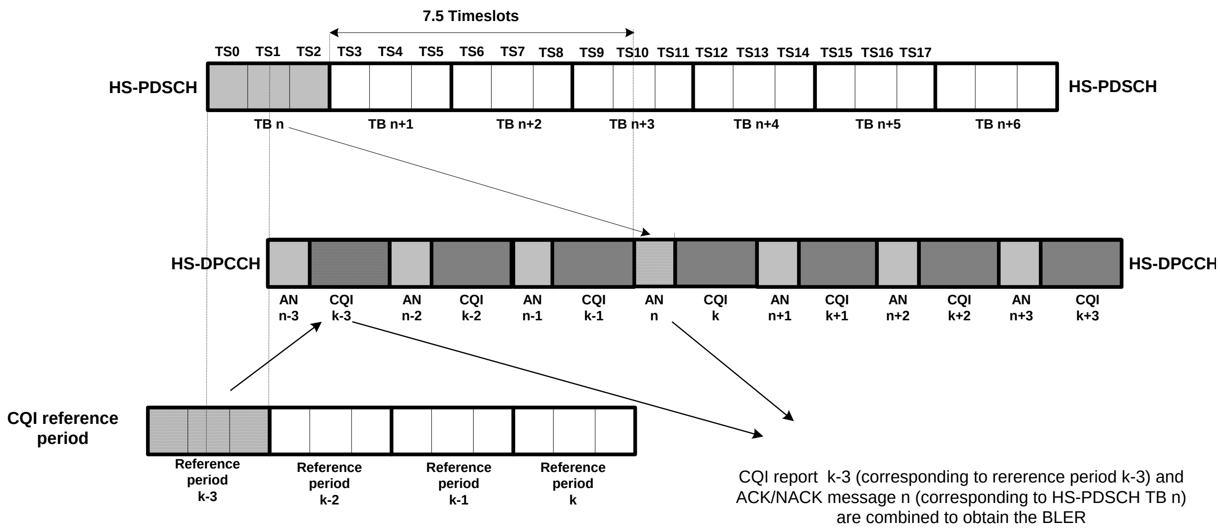

Figure 9.3.4.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.4.1.

Table 9.3.4.3: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1

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

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - POhsdsch	 FDD 2 FDD Compatible with the values in table 9.3.4.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - Added or reconfigured MAC-d flow - MAC-hs queue to add or reconfigure list - MAC-d PDU size Info - MAC-d PDU size	 HS-DSCH 2 (one queue) 112 bits (Note 1)
- MAC-d PDU size index	0
- MAC-d PDU size	448 bits (Note 1)
- MAC-d PDU size index	1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	 FDD STTD
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	 FDD 1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

9.3.4.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.5 Closed Loop Diversity Performance - AWGN Propagation Conditions

9.3.5.1 Definition and applicability

The reporting accuracy of channel quality indicator (CQI) under AWGN environments is determined by the reporting variance and the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.5.2 Minimum requirements

For the parameters specified in Table 9.3.5.1, and using the downlink physical channels specified in table E.5.3 the reported CQI value shall be in the range of +/-2 of the reported median more than 90% of the time. If the HS-PDSCH BLER using the transport format indicated by median CQI is less than or equal to 0.1, the BLER using the transport format indicated by the (median CQI +2) shall be greater than 0.1. If the HS-PDSCH BLER using the transport format indicated by the median CQI is greater than 0.1, the BLER using transport format indicated by (median CQI -1) shall be less than or equal to 0.1.

Table 9.3.5.1: Test Parameters for CQI test in AWGN - single link

Parameter	Unit	Test 1	Test 2	Test 3
$\hat{I}_{or}/I_{oc}$	dB	0	5	10
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
HS-PDSCH E_c/I_{or}	dB	-3		
HS-SCCH_1 E_c/I_{or}	dB	-10		
DPCH E_c/I_{or}	dB	-10		
Maximum number of H-ARQ transmission	-	1		
Number of HS-SCCH set to be monitored	-	1		
CQI feedback cycle	ms	2		
CQI repetition factor	-	1		
Feedback Error Rate	%	0		
Closed loop timing adjustment mode		1		
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]. Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI, median CQI -1, median CQI+2 are used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.				

The reference for this requirement is TS 25.101 [1] clause 9.3.3.1.

9.3.5.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2.

9.3.5.4 Method of test

9.3.5.4.1 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 and an AWGN noise source to the UE antenna connector as shown in figure A.12a.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.5.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.5.2, with levels according to table E.5.0.

2) Set test conditions according to test 1 according table 9.3.5.1. The configuration of the downlink channels is defined in table E.5.3.

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

3) The SS shall send the TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

5) If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 6), otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

6) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 7), otherwise goto step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK /ACK + NACK) ≥ 0.1

then pass the UE, otherwise fail the UE

8) The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 6 until 1000 filtered ACK+NACK responses are gathered.

If the ratio (NACK / ACK + NACK) < 0.1

then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

9) Repeat the same procedure (steps 3 to 8) with test conditions according to the table 9.3.5.1 for Test 2 and Test 3.

Table 9.3.5.2: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1

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

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - POhsdsch	 FDD 2 FDD Compatible with the values in table 9.3.5.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - Added or reconfigured MAC-d flow - MAC-hs queue to add or reconfigure list - MAC-d PDU size Info - MAC-d PDU size - MAC-d PDU size index - MAC-d PDU size - MAC-d PDU size index	 HS-DSCH 2 (one queue) 112 bits (Note 1) 0 448 bits (Note 1) 1
CHOICE channel requirement - Number of FBI bit	Uplink DPCH info 1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	 FDD Closed loop mode1
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	 FDD 1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

9.3.5.5 Test Requirements

The pass fail decision is as specified in the test procedure in clause 9.3.5.4.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.6 Closed Loop Diversity Performance - Fading Propagation Conditions

9.3.6.1 Definition and applicability

The reporting accuracy of the channel quality indicator (CQI) under fading environments is determined by the BLER performance using the transport format indicated by the reported CQI median.

The requirements and this test apply to Release 6 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 1 to 12.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support HSDPA UE capability categories 13 to 20.

9.3.6.2 Minimum requirements

For the parameters specified in Table 9.3.6.1, and using the downlink physical channels specified in table E.5.3, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.6.2. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes.

Table 9.3.6.1: Test Parameters for CQI test in fading - single link

Parameter	Unit	Test 1	Test 2
HS-PDSCH E_c / I_{or}	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
I_{OC}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
HS-SCCH_1 E_c / I_{or}	dB	-8.5	
DPCH E_c / I_{or}	dB	-6	
Maximum number of H-ARQ transmission	-	1	
Number of HS-SCCH set to be monitored	-	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
Feedback Error Rate	%	0	
Closed loop timing adjustment mode		1	
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Propagation Channel		Case 8	
Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214 NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214. NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.			

Table 9.3.6.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximum BLER	
	Test 1	Test2
CQI median	60%	60%
CQI median + 3	15%	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.3.2.

9.3.6.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.6.4 Method of test

9.3.6.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.12.

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

3) Setup the fading simulators with fading conditions as described in table D.2.2.1B and clause D.2.7.

9.3.6.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.6.3, with levels according to table E.5.0. Set test conditions according to test 1 according table 9.3.6.1. The configuration of the downlink channels is defined in table E.5.3.

2) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 8200 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

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

4) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.6.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

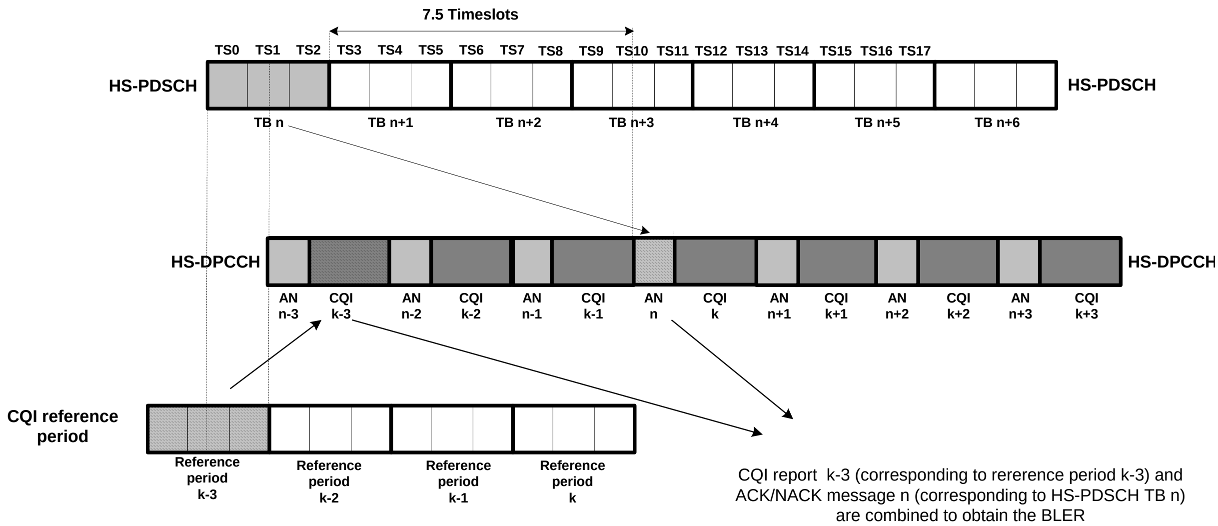

Figure 9.3.6.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Repeat the same procedure with test conditions according to the test 2 of table 9.3.6.1.

Table 9.3.6.3: Specific Message Contents for closed loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1

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

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
Downlink HS-PDSCH Information - HS-SCCH Info - CHOICE mode - DL Scrambling Code - HS-SCCH Channelisation Code Info - HS-SCCH Channelisation Code - Measurement Feedback Info - CHOICE mode - POhsdsch	 FDD 2 FDD Compatible with the values in table 9.3.6.1 and according to TS 25.214 [5] clause 6A.2
- Added or Reconfigured DL TrCH information - CHOICE DL parameters - HARQ Info - Number of Processes - Added or reconfigured MAC-d flow - MAC-hs queue to add or reconfigure list - MAC-d PDU size Info - MAC-d PDU size - MAC-d PDU size index - MAC-d PDU size - MAC-d PDU size index	 HS-DSCH 2 (one queue) 112 bits (Note 1) 0 448 1
CHOICE channel requirement - Number of FBI bit	Uplink DPCH info 1
Downlink information common for all radio links - CHOICE mode - TX Diversity Mode	 FDD Closed loop mode1
Downlink DPCH info for each RL - CHOICE mode - Downlink DPCH info for each RL - Closed loop timing adjustment mode	 FDD 1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDU size of 112 is used. For other UE categories, MAC-d PDU sizes of 112 and 448 are used. Less than CQI value of 23 according to [5], 112 is used, and above the CQI values, 448 is used.	

9.3.6.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.6.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7 MIMO Performance - Reporting of Channel Quality Indicator

The test cases in this section define the MIMO Performance test for Reporting of Channel Quality Indicator.

9.3.7A MIMO Single Stream Fading Conditions

9.3.7A.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO single stream conditions are defined based on a CQI Type A versus Type B reporting ratio of 1 / 2, i.e. the parameters N_cqi_typeA and M_cqi (see [5]) are assumed to be set to 1 and 2, respectively. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO single stream conditions are defined in subclause D.2.9.1. The precoding used at the transmitter is one randomly picked but fixed precoding vector for single transport block transmission out of the set of possible precoding vectors as defined in [5]. The same precoding vector shall be used to generate the resulting channel coefficients as described for MIMO single stream conditions in subclause D.2.9.1.

The reporting accuracy of CQI under MIMO single stream conditions is determined by the BLER performance when transmitting with a transport format indicated by the reported CQI median determined over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1.

The requirements and this test apply for Release 7 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 - 18.

The requirements and this test also apply for Release 8 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.3.7A.2 Minimum requirements

For the parameters specified in Table 9.3.7A.1, and using the downlink physical channels specified in table E.5.2, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.7A.2. The CQI median shall be determined over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1 with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes to which the same CQI value was associated.

Table 9.3.7A.1: Test Parameters for CQI test in MIMO single stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c/I_{or}	dB	-2
$\hat{I}_{or}/I_{oc}$	dB	6
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH (E.5.2)
HS-SCCH_1 E_c/I_{or}	dB	-15 (using STTD)
DPCH E_c/I_{or}	dB	-10 (using STTD)
Precoding weight set restriction	-	Disabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO single stream fading conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1 is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding vector for single transport block transmission out of the set of possible precoding vectors as defined in [5]. The same precoding vector shall be used to generate the resulting channel coefficients as described for MIMO single stream conditions in subclause D.2.9.1. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7A.2: Minimum requirement for CQI test in MIMO single stream conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 3	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.1.

9.3.7A.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.7A.4 Method of test

9.3.7A.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

3) Setup the fading simulators with fading conditions as described in table D.2.9.1.

9.3.7A.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7A.3 and exceptions in Annex I, with levels according to table E.5.2. Set test conditions according to test 1 according table 9.3.7A.1. The configuration of the downlink channels is defined in table E.5.2.

2) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3) Set up a relative frequency distribution for the reported CQI values that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value.

4) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7A.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Then filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1.
   Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

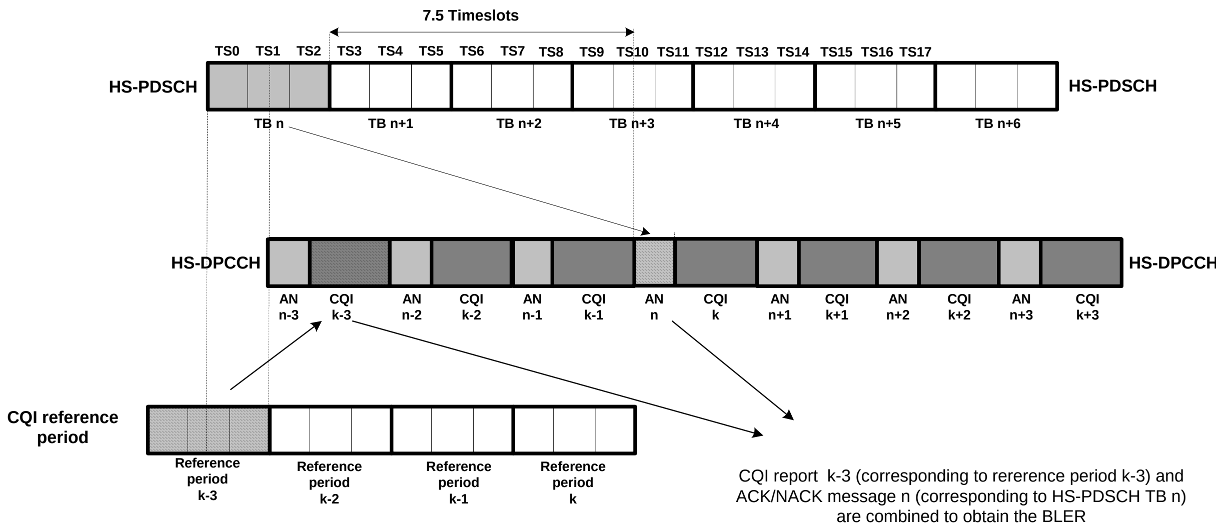

Figure 9.3.7A.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Table 9.3.7A.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark

MIMO parameters
- MIMO operation
  - MIMO N_cqi_typeA/M_cqi ratio
  - MIMO pilot configuration
  - CHOICE Second CPICH pattern
  >Antenna2 P-CPICH
- Precoding weight set restriction
	
	Start
	½
	
	Not Present

9.3.7A.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.7A.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7B MIMO Dual Stream Fading Conditions

9.3.7B.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters N_cqi_typeA and M_cqi (see [5]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream conditions are defined in subcaluse D.2.9.2. The precoding used at the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subcaluse D.2.9.2.

The reporting accuracy of CQI under MIMO dual stream conditions is determined by the BLER performance of two streams of transport blocks using the transport formats indicated by the respective stream specific reported CQI median over all dual transport block CQI reports for each stream that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2.

The requirements and this test apply for Release 7 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 - 18.

The requirements and this test also apply for Release 8 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 - 20.

9.3.7B.2 Minimum requirements

For the parameters specified in Table 9.3.7B.1, and using the downlink physical channels specified in table E.5.2, the requirements are specified in terms of maximum BLERs at particular reported CQIs for each stream when transmitting a fixed transport format per stream given by the stream specific CQI median as shown in Table 9.3.7B.2. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. The stream specific BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all dual transport block CQI reports that were reported together with a PCI report that was matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2 with the two transport blocks of the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same CQI values were associated.

Table 9.3.7B.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2
$\hat{I}_{or} / I_{oc}$	dB	10
I_{OC}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH (Table E.5.2)
HS-SCCH_1 E_c / I_{or}	dB	-15 (using STTD)
DPCH E_c / I_{or}	dB	-10 (using STTD)
Precoding weight set restriction	-	Disabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream fading conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured for each stream according to the reported CQI statistics. TF for each stream is based on median CQI over all dual transport block CQI reports that are reported together with a PCI report that is matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.9.2. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7B.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 3	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.2.

9.3.7B.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.7B.4 Method of test

9.3.7B.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

3) Setup the fading simulators with fading conditions as described in table D.2.9.2.

9.3.7B.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7B.3 and exceptions in Annex I, with levels according to table E.5.2. Set test conditions according to test 1 according table 9.3.7B.1. The configuration of the downlink channels is defined in table E.5.2.

2) For each stream, the SS shall send TF according to CQI value 7 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3) The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.

4) For each stream, the SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For each stream, for any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7B.1 below.)

   For each stream, the responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK.
   Then, for each stream, filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below for each stream.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

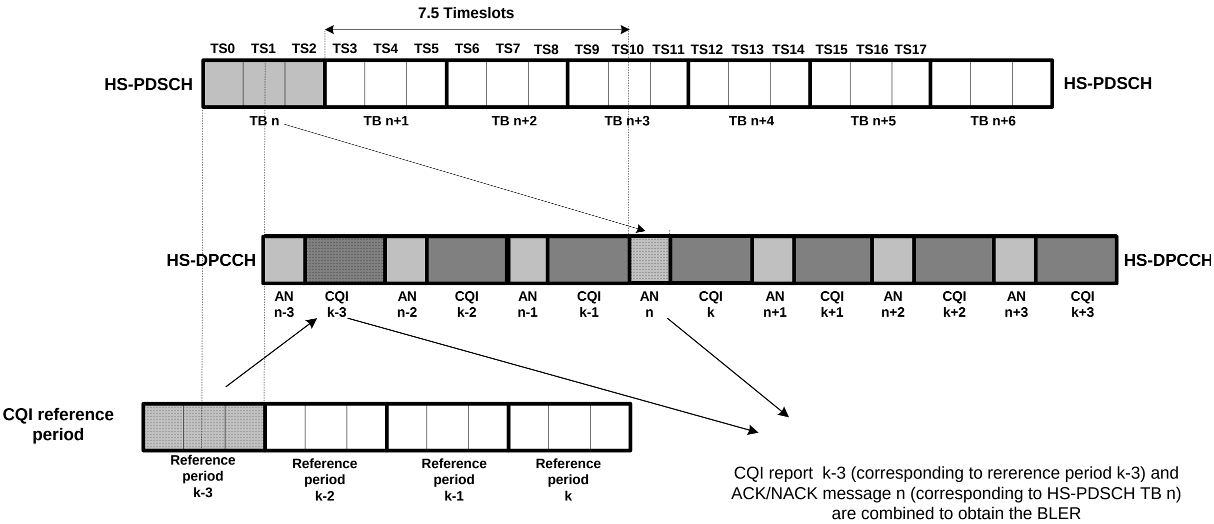

Figure 9.3.7B.1 Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Table 9.3.7B.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
Precoding weight set restriction	Not Present

9.3.7B.5 Test Requirements

For each stream, the measured BLER shall not exceed values specified in table 9.3.7B.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7C MIMO Dual Stream Fading Conditions - UE categories 19-20

9.3.7C.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters *N*_cqi_typeA and *M*_cqi (see [5]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream conditions are defined in subclause D.2.9.2. The precoding used at the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.9.2.

The reporting accuracy of CQI under MIMO dual stream conditions is determined by the BLER performance of two streams of transport blocks using the transport formats indicated by the respective stream specific reported CQI median over all dual transport block CQI reports for each stream that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2.

The requirements and this test apply for Release 8 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19and 20.

9.3.7C.2 Minimum requirements

For the parameters specified in Table 9.3.7C.1, and using the downlink physical channels specified in table E.5.2, the requirements are specified in terms of maximum BLERs at particular reported CQIs for each stream when transmitting a fixed transport format per stream given by the stream specific CQI median as shown in Table 9.3.7C.2. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. The stream specific BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all dual transport block CQI reports that were reported together with a PCI report that was matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2 with the two transport blocks of the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same CQI values were associated.

Table 9.3.7C.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2
$\hat{I}_{or} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH(E.5.2)
HS-SCCH_1 E_c / I_{or}	dB	-15 (using STTD)
DPCH E_c / I_{or}	dB	-10 (using STTD)
Precoding weight set restriction	-	Disabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured for each stream according to the reported CQI statistics. TF for each stream is based on median CQI over all dual transport block CQI reports that are reported together with a PCI report that is matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.6.2. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.6.2. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in 64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7C.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 2	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.2.

9.3.7C.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+2 is ≤ 15%.

9.3.7C.4 Method of test

9.3.7C.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.
2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.
3. Setup the fading simulators with fading conditions as described in table D.2.9.2.

9.3.7C.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7C.3 and exceptions in Annex I, with levels according to table E.5.2. Set test conditions according to test 1 according table 9.3.7C.1. The configuration of the downlink channels is defined in table E.5.2.
2. For each stream, the SS shall send TF according to CQI value 6 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.
3. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.
4. For each stream, the SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For each stream, for any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7C.1 below.)

   For each stream, the responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK.
   Then, for each stream, filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 2 have been collected.

5. Measure BLER as described below for each stream.

   In the test there are two BLER requirements to be tested:

   R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

   R2: HSDPA block with corresponding reported CQI = Median CQI + 2 BLER ≤ 15%

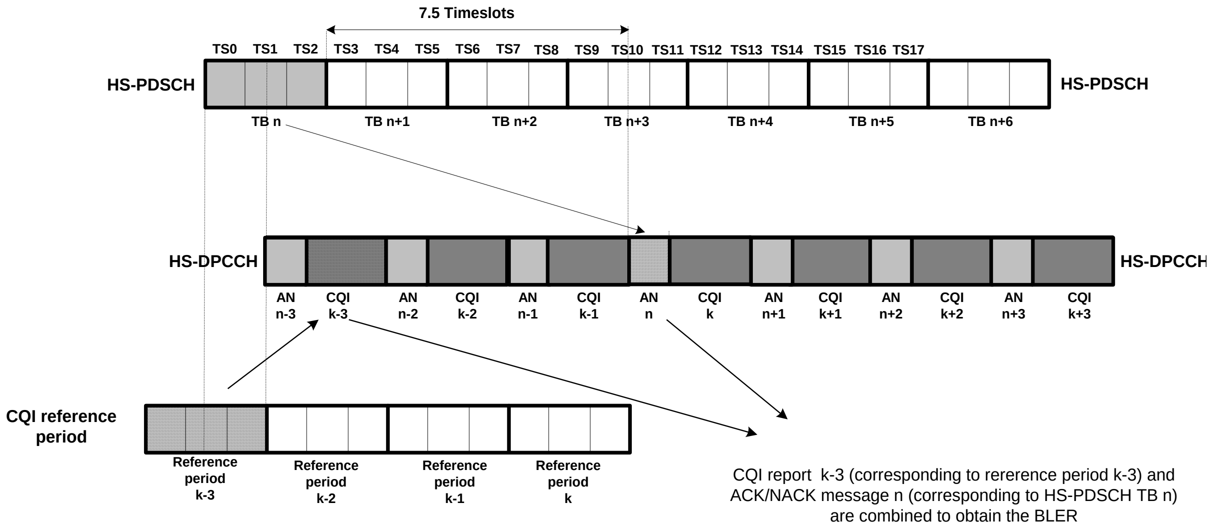

Figure 9.3.7C.1: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

RADIO BEARER SETUP for HSDPA Test 1

Table 9.3.7C.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.3.7C.5 Test Requirements

For each stream, the measured BLER shall not exceed values specified in table 9.3.7C.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7D MIMO Dual Stream Static Orthogonal Conditions - UE categories 15-20

9.3.7D.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters N_cqi_typeA and M_cqi (see [5] are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream static orthogonal conditions are defined in subclause D.2.9.3. The precoding matrix used in the transmitter shall be one randomly picked but fixed precoding matrix $\mathbf{W}$ out of the set defined in equation as defined in [5].

The requirements and this test apply for Release 8 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 to 20.

9.3.7D.2 Minimum requirements

For the parameters specified in Table 9.3.7D.1, and using the downlink physical channels specified in table E.5.2, the reported CQI value, for each of the streams, shall be in the range of +/-2 of the reported stream specific CQI median more than 90% of the time. The stream specific CQI median shall be determined over all dual transport block CQI reports.

For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is less than or equal to 0.1, the BLER using the transport format indicated by the (stream specific CQI median + 2) shall be greater than 0.1. For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is greater than 0.1, the BLER using transport format indicated by (stream specific CQI median -1) shall be less than or equal to 0.1.

Table 9.3.7D.1: Test Parameters for CQI test in MIMO dual stream static orthogonal conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2
$\hat{I}_{or} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH (E.5.2)
HS-SCCH_1 E_c / I_{or}	dB	-15 (using STTD)
DPCH E_c / I_{or}	dB	-10(using STTD)
Precoding weight set restriction	-	Disabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream static orthogonal conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 3: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 4: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.		

The reference for this requirement is TS 25.101 [1] clause 9.3.4.3.1

9.3.7D.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2 for each stream.

9.3.7D.4 Method of test

9.3.7D.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.7D.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7D.2 and exceptions in Annex I, with levels according to table E.5.2. Set test conditions according to test 1 according table 9.3.7D.1. The configuration of the downlink channels is defined in table E.5.2.

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

2. For each stream, the SS shall send TF according to CQI value 7 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.

4. For each stream, If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 5, otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

5. For each stream ,SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For each stream, for any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For each stream, and for the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 6), otherwise goto step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

7. The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

Table 9.3.7D.2: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.3.7D.5 Test Requirements

Pass fail decision is as specified in the test procedure in 9.3.7D.4.2

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7E MIMO Dual Stream Static Orthogonal Conditions - UE categories 19-20

9.3.7E.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters *N*_cqi_typeA and *M*_cqi (see [5])]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream static orthogonal conditions are defined in subclause D.2.9.3. The precoding matrix used in the transmitter shall be one randomly picked but fixed precoding matrix $\mathbf{W}$ out of the set defined in equation as defined in [5].

The requirements and this test apply for Release 8 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 to 20.

9.3.7E.2 Minimum requirements

For the parameters specified in Table 9.3.7E.1, and using the downlink physical channels specified in table E.5.2, the reported CQI value, for each of the streams, shall be in the range of +/-2 of the reported stream specific CQI median more than 90% of the time. The stream specific CQI median shall be determined over all dual transport block CQI reports.

For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is less than or equal to 0.1, the BLER using the transport format indicated by the (stream specific CQI median + 2) shall be greater than 0.1. For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is greater than 0.1, the BLER using transport format indicated by (stream specific CQI median -1) shall be less than or equal to 0.1.

Table 9.3.7E.1: Test Parameters for CQI test in MIMO dual stream static orthogonal

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2
$\hat{I}_{or} / I_{oc}$	dB	15
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH (E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (using STTD)
DPCH E_c / I_{or}	dB	-10(using STTD)
Precoding weight set restriction	-	Disabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream static orthogonal conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 3: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 4: The UE shall be configured in 64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

The reference for this requirement is TS 25.101 [1] clause 9.3.4.3.2

9.3.7E.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2 for each stream.

9.3.7E.4 Method of test

9.3.7E.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.7E.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7E.2 and exceptions in Annex I, with levels according to table E.5.2. Set test conditions according to test 1 according table 9.3.7D.1. The configuration of the downlink channels is defined in table E.5.2.

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

2. For each stream, the SS shall send TF according to CQI value 6 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.

4. For each stream, If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 5, otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

5. For each stream ,SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For each stream, for any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For each stream, and for the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 6), otherwise goto step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

7. The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

Table 9.3.7E.2: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.3.7E.5 Test Requirements

Pass fail decision is as specified in the test procedure in 9.3.7E.4.2

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7F MIMO Single Stream Fading Conditions - Asymmetric CPICHs

9.3.7F.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO single stream conditions are defined based on a CQI Type A versus Type B reporting ratio of 1/2, i.e. the parameters *N*_cqi_typeA and *M*_cqi (see [5]) are assumed to be set to 1 and 2, respectively. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO single stream conditions are defined in subclause D.2.9.1. The precoding used at the transmitter is one randomly picked but fixed precoding vector for single transport block transmission out of the set of possible precoding vectors as defined in [5]. The same precoding vector shall be used to generate the resulting channel coefficients as described for MIMO single stream conditions in subclause D.2.9.1.

The reporting accuracy of CQI under MIMO single stream conditions is determined by the BLER performance when transmitting with a transport format indicated by the reported CQI median determined over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 15-20.

NOTE: This test case can be optionally tested for Rel-7 and onward UE's supporting MIMO feature.

9.3.7F.2 Minimum requirements

For the parameters specified in Table 9.3.7F.1, and using the downlink physical channels specified in table E.5.4D, the requirements are specified in terms of maximum BLERs at particular reported CQIs when transmitting a fixed transport format given by the CQI median as shown in Table 9.3.7F.2. The CQI median shall be determined over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1. The BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1 with the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fraction of erroneous HS-PDSCH subframes to which the same CQI value was associated.

Table 9.3.7F.1: Test Parameters for CQI test in MIMO single stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	6
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH/S-CPICH (E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (without STTD)
DPCH E_c / I_{or}	dB	-10 (without STTD)
Precoding weight set restriction	-	Enabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO single stream fading conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI over all single transport block Type A CQI reports and all Type B CQI reports that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1 is used. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding vector for single transport block transmission out of the set of possible precoding vectors as defined in [5]. The same precoding vector shall be used to generate the resulting channel coefficients as described for MIMO single stream conditions in subclause D.2.9.1. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7F.2: Minimum requirement for CQI test in MIMO single stream conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 3	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.1.

9.3.7F.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.7F.4 Method of test

9.3.7F.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

3) Setup the fading simulators with fading conditions as described in table D.2.9.1.

9.3.7F.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7F.3 and exceptions in Annex I, with levels according to table E.5.4D. Set test conditions according to test 1 according table 9.3.7F.1. The configuration of the downlink channels is defined in table E.5.4D.

2) The SS shall send TF according to CQI value 16 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3) Set up a relative frequency distribution for the reported CQI values that were reported together with PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value.

4) The SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7F.1 below.)

   The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Then filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1.
   Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

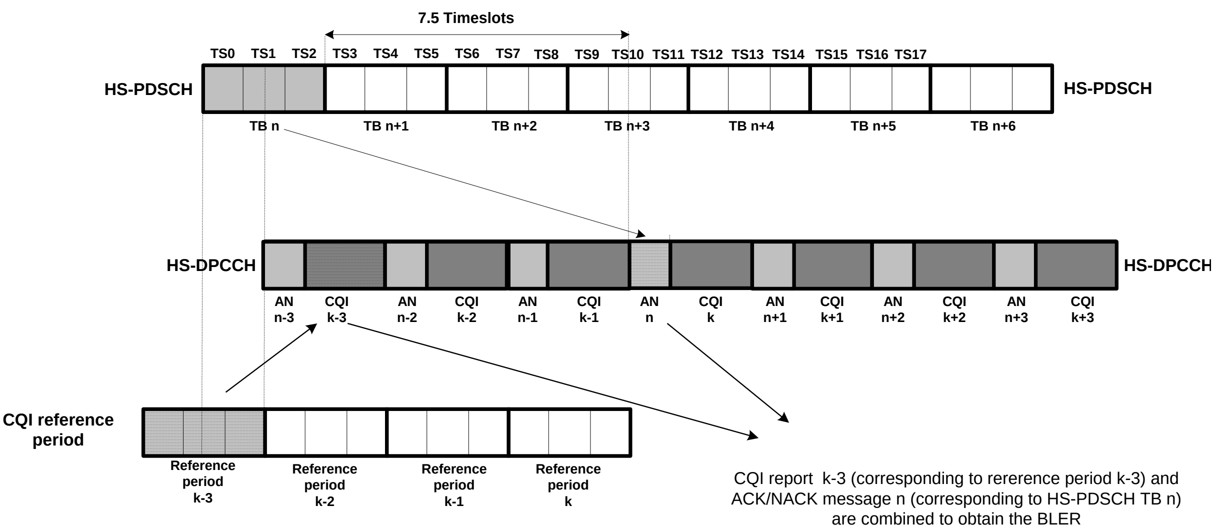

Figure 9.3.7F.1: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Table 9.3.7F.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	TRUE

9.3.7F.5 Test Requirements

The measured BLER shall not exceed values specified in table 9.3.7F.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7G MIMO Dual Stream Fading Conditions- Asymmetric CPICHs

9.3.7G.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters *N*_cqi_typeA and *M*_cqi (see [5]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream conditions are defined in subcaluse D.2.9.2. The precoding used at the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subcaluse D.2.9.2.

The reporting accuracy of CQI under MIMO dual stream conditions is determined by the BLER performance of two streams of transport blocks using the transport formats indicated by the respective stream specific reported CQI median over all dual transport block CQI reports for each stream that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2.

The requirements and this test apply to Release 10 and later releases for all types of UTRA for FDD UE that support HSDPA UE capability categories 15-20.

NOTE: This test case can be optionally tested for Rel-7 and onward UE's supporting MIMO feature.

9.3.7G.2 Minimum requirements

For the parameters specified in Table 9.3.7G.1, and using the downlink physical channels specified in Table E.5.4D, the requirements are specified in terms of maximum BLERs at particular reported CQIs for each stream when transmitting a fixed transport format per stream given by the stream specific CQI median as shown in Table 9.3.7G.2. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. The stream specific BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all dual transport block CQI reports that were reported together with a PCI report that was matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2 with the two transport blocks of the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same CQI values were associated.

Table 9.3.7G.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	10
I_{OC}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH/S-CPICH (Table E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (without STTD)
DPCH E_c / I_{or}	dB	-10 (without STTD)
Precoding weight set restriction	-	Enabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream fading conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured for each stream according to the reported CQI statistics. TF for each stream is based on median CQI over all dual transport block CQI reports that are reported together with a PCI report that is matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.9.2. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5:: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7G.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 3	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.2.

9.3.7G.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+3 is ≤ 15%.

9.3.7G.4 Method of test

9.3.7G.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2) Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

3) Setup the fading simulators with fading conditions as described in table D.2.9.2.

9.3.7G.4.2 Procedure

1) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7G.3 and exceptions in Annex I, with levels according to table E.5.4D. Set test conditions according to test 1 according table 9.3.7G.1. The configuration of the downlink channels is defined in table E.5.4D.

2) For each stream, the SS shall send TF according to CQI value 7 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3) The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.

4) For each stream, the SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For each stream, for any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7G.1 below.)

   For each stream, the responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK.
   Then, for each stream, filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 3 have been collected.

5) Measure BLER as described below for each stream.

In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER ≤ 15%

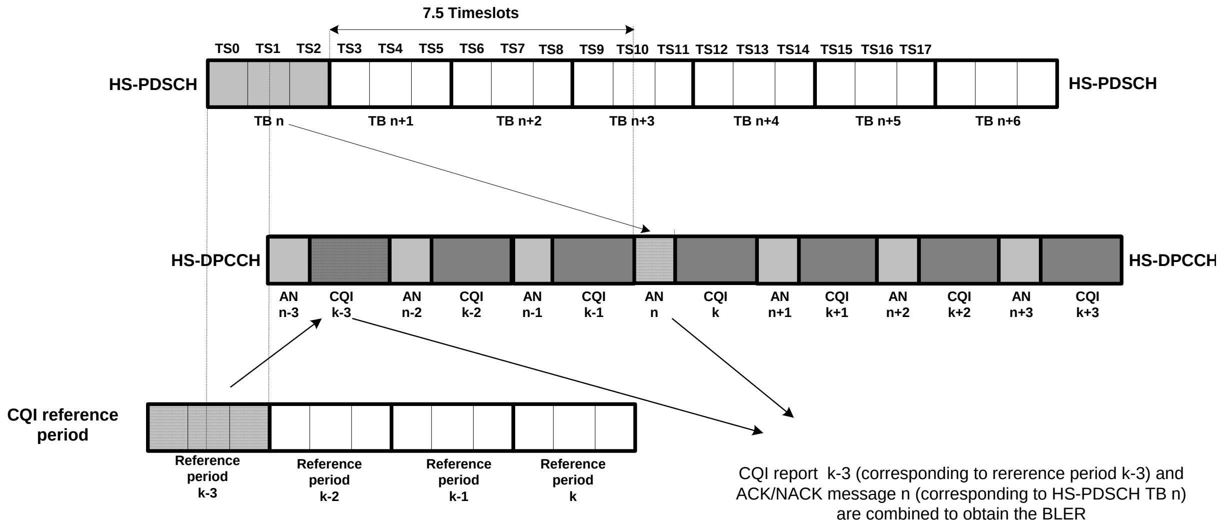

Figure 9.3.7G.1: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

Table 9.3.7G.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	TRUE

9.3.7G.5 Test Requirements

For each stream, the measured BLER shall not exceed values specified in table 9.3.7G.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7H MIMO Dual Stream Fading Conditions - UE categories 19-20 - Asymmetric CPICHs

9.3.7H.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters *N*_cqi_typeA and *M*_cqi (see [5]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream conditions are defined in subclause D.2.9.2. The precoding used at the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.9.2.

The reporting accuracy of CQI under MIMO dual stream conditions is determined by the BLER performance of two streams of transport blocks using the transport formats indicated by the respective stream specific reported CQI median over all dual transport block CQI reports for each stream that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19and 20.

NOTE: This test case can be optionally tested for Rel-8 and onward UE's supporting MIMO feature.

9.3.7H.2 Minimum requirements

For the parameters specified in Table 9.3.7H.1, and using the downlink physical channels specified in table E.5.4D, the requirements are specified in terms of maximum BLERs at particular reported CQIs for each stream when transmitting a fixed transport format per stream given by the stream specific CQI median as shown in Table 9.3.7H.2. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. The stream specific BLER at a particular reported CQI is obtained by associating a particular CQI reference measurement period for all dual transport block CQI reports that were reported together with a PCI report that was matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2 with the two transport blocks of the HS-PDSCH subframe overlapping with the end of this CQI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same CQI values were associated.

Table 9.3.7H.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH/S-CPICH (E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (without STTD)
DPCH E_c / I_{or}	dB	-10 (without STTD)
Precoding weight set restriction	-	Enabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: TF for HS-PDSCH is configured for each stream according to the reported CQI statistics. TF for each stream is based on median CQI over all dual transport block CQI reports that are reported together with a PCI report that is matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.6.2. Other physical channel parameters are configured according to the CQI mapping table described in TS25.214. The precoding that shall be used in the transmitter is one randomly picked but fixed precoding matrix for dual transport block transmission out of the set of possible precoding matrices as defined in [5]. The same precoding matrix shall be used to generate the resulting channel coefficients as described for MIMO dual stream conditions in subclause D.2.6.2. NOTE 3: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 5: The UE shall be configured in 64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7H.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Reported CQI	Maximum BLER
	Test 1
CQI median	60%
CQI median + 2	15%

The reference for this requirement is TS 25.101 [1] clause 9.3.4.2.

9.3.7H.3 Test purpose

To verify that when using the TF based on the Median CQI that the BLER for blocks associated with CQI reports of Median CQI is ≤ 60% and that the BLER for blocks associated with CQI reports of Median CQI+2 is ≤ 15%.

9.3.7H.4 Method of test

9.3.7H.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.
2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.
3. Setup the fading simulators with fading conditions as described in table D.2.9.2.

9.3.7H.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7H.3 and exceptions in Annex I, with levels according to table E.5.4D. Set test conditions according to test 1 according table 9.3.7H.1. The configuration of the downlink channels is defined in table E.5.4D.
2. For each stream, the SS shall send TF according to CQI value 6 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 82000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.
3. The stream specific CQI median shall be determined over all dual transport block CQI reports that were reported together with PCI reports matching the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2. When the reported preferred primary precoding vector is matching with the first column of the precoding matrix embedded in the propagation channel as defined in subcaluse D.2.9.2, the reported values CQI_1 and CQI_2 shall be used respectively to determine the median CQI values for stream #1 and stream #2 as depicted in Figure D.2.9.2 in subclause D.2.9.2. When the reported preferred primary precoding vector is matching with the second column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI_1 and CQI_2 shall be used to determine the median CQI values for stream #2 and stream #1, respectively. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.
4. For each stream, the SS shall transmit the TF according to the median-CQI value and shall not react to the UE's reported CQI value. For each stream, for any HSDPA block transmitted by the SS, record the ACK, NACK and statDTX responses, and associate with each response the CQI report that corresponds to the CQI evaluation period in which the end of the HS-PDSCH is received. (See figure 9.3.7H.1 below.)

   For each stream, the responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK.
   Then, for each stream, filter the responses based on the PCI values. Keep only the responses that have the PCI reports matching the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2. Continue to gather and filter responses until 1000 filtered responses with CQI = Median CQI and 1000 filtered responses with CQI = Median CQI + 2 have been collected.
5. Measure BLER as described below for each stream.

   In the test there are two BLER requirements to be tested:

   R1: HSDPA block with corresponding reported CQI = Median CQI BLER ≤ 60%

   R2: HSDPA block with corresponding reported CQI = Median CQI + 2 BLER ≤ 15%

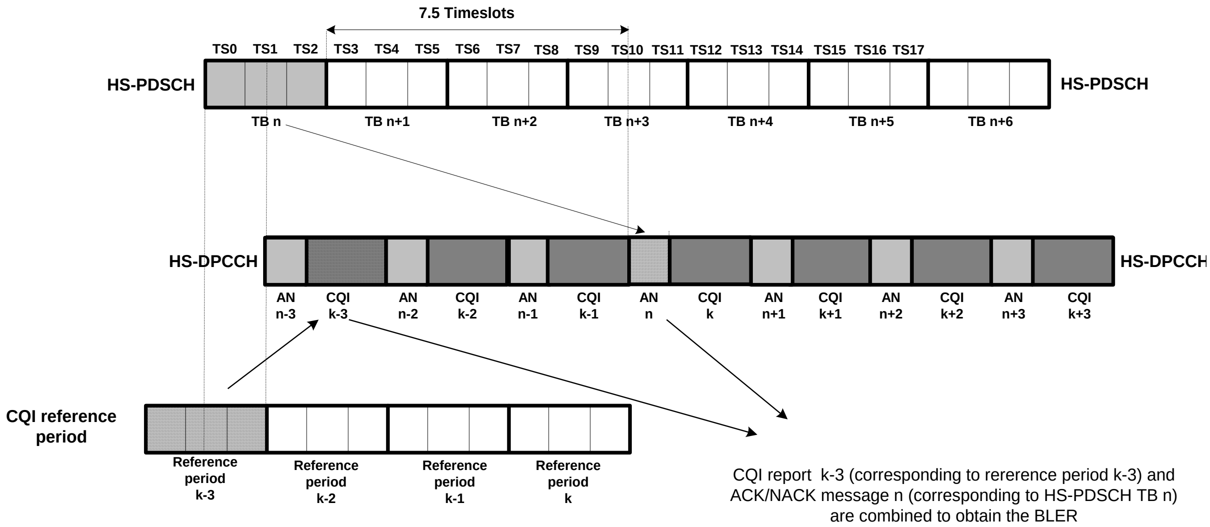

Figure 9.3.7H.1: Combination of ACK/NACK message and the CQI report for BLER calculation

For each set of events R1 and R2 the BLER = (NACK) / (ACK + NACK)

RADIO BEARER SETUP for HSDPA Test 1

Table 9.3.7H.3: Specific Message Contents for MIMO

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	TRUE

9.3.7H.5 Test Requirements

For each stream, the measured BLER shall not exceed values specified in table 9.3.7H.2.

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7I MIMO Dual Stream Static Orthogonal Conditions - UE categories 15-20 - Asymmetric CPICHs

9.3.7I.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters N_cqi_typeA and M_cqi (see [5] are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream static orthogonal conditions are defined in subclause D.2.9.3. The precoding matrix used in the transmitter shall be one randomly picked but fixed precoding matrix $\mathbf{W}$ out of the set defined in equation as defined in [5].

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 to 20.

NOTE: This test case can be optionally tested for Rel-8 and onward UE's supporting MIMO feature.

9.3.7I.2 Minimum requirements

For the parameters specified in Table 9.3.7I.1, and using the downlink physical channels specified in table E.5.4D, the reported CQI value, for each of the streams, shall be in the range of +/-2 of the reported stream specific CQI median more than 90% of the time. The stream specific CQI median shall be determined over all dual transport block CQI reports.

For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is less than or equal to 0.1, the BLER using the transport format indicated by the (stream specific CQI median + 2) shall be greater than 0.1. For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is greater than 0.1, the BLER using transport format indicated by (stream specific CQI median -1) shall be less than or equal to 0.1.

Table 9.3.7I.1: Test Parameters for CQI test in MIMO dual stream static orthogonal conditions

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	10
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH/S-CPICH (E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (without STTD)
DPCH E_c / I_{or}	dB	-10(without STTD)
Precoding weight set restriction	-	Enabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream static orthogonal conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 3: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 4: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.		

The reference for this requirement is TS 25.101 [1] clause 9.3.4.3.1

9.3.7I.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2 for each stream.

9.3.7I.4 Method of test

9.3.7I.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.7I.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7I.2 and exceptions in Annex I, with levels according to table E.5.4D. Set test conditions according to test 1 according table 9.3.7I.1. The configuration of the downlink channels is defined in table E.5.4D.

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

2. For each stream, the SS shall send TF according to CQI value 7 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.

3. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.

4. For each stream, If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 5, otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

5. For each stream ,SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For each stream, for any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For each stream, and for the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 6), otherwise goto step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

7. The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

Table 9.3.7I.2: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	TRUE

9.3.7I.5 Test Requirements

Pass fail decision is as specified in the test procedure in 9.3.7I.4.2

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.3.7J MIMO Dual Stream Static Orthogonal Conditions - UE categories 19-20- Asymmetric CPICHs

9.3.7J.1 Definition and applicability

The minimum performance requirements of channel quality indicator (CQI) reporting under MIMO dual stream conditions are defined based on a Type A reporting fraction of 100%, i.e. the parameters N_cqi_typeA and M_cqi (see [5])]) are assumed to be both set to 1. The propagation conditions assumed for minimum performance requirements of CQI reporting under MIMO dual stream static orthogonal conditions are defined in subclause D.2.9.3. The precoding matrix used in the transmitter shall be one randomly picked but fixed precoding matrix $\mathbf{W}$ out of the set defined in equation as defined in [5].

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 19 to 20.

NOTE: This test case can be optionally tested for Rel-8 and onward UE's supporting MIMO feature.

9.3.7J.2 Minimum requirements

For the parameters specified in Table 9.3.7J.1, and using the downlink physical channels specified in table E.5.4D, the reported CQI value, for each of the streams, shall be in the range of +/-2 of the reported stream specific CQI median more than 90% of the time. The stream specific CQI median shall be determined over all dual transport block CQI reports.

For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is less than or equal to 0.1, the BLER using the transport format indicated by the (stream specific CQI median + 2) shall be greater than 0.1. For each of the streams, if the HS-PDSCH BLER using the transport format indicated by the stream specific CQI median is greater than 0.1, the BLER using transport format indicated by (stream specific CQI median -1) shall be less than or equal to 0.1.

Table 9.3.7J.1: Test Parameters for CQI test in MIMO dual stream static orthogonal

Parameter	Unit	Test 1
HS-PDSCH E_c / I_{or}	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	15
I_{oc}	dBm/3.84 MHz	-60
Phase reference	-	P-CPICH/S-CPICH (E.5.4D)
HS-SCCH_1 E_c / I_{or}	dB	-15 (using STTD)
DPCH E_c / I_{or}	dB	-10(using STTD)
Precoding weight set restriction	-	Enabled
Maximum number of H-ARQ transmission	-	1
Number of HS-SCCH set to be monitored	-	1
CQI feedback cycle	Ms	2
CQI repetition factor	-	1
PCI/CQI reporting Error Rate	%	0
HS-SCCH-1 signalling pattern	-	To incorporate inter-TTI=3 the six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.
Propagation Channel		MIMO dual stream static orthogonal conditions
NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] NOTE 2: HS-PDSCH Ec/Ior is decreased according to reference power adjustment Δ described in TS 25.214 NOTE 3: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power. NOTE 4: The UE shall be configured in 64QAM/MIMO mode and use appropriate CQI tables according to TS 25.214.		

The reference for this requirement is TS 25.101 [1] clause 9.3.4.3.2

9.3.7J.3 Test purpose

To verify that the variance of the CQI reports when using TF based on CQI 16 is within the limits defined and that a BLER of 10% falls between the TF based on Median CQI-1 and the TF based on Median CQI TF or between the TF based on Median CQI and the TF based on Median CQI+2 for each stream.

9.3.7J.4 Method of test

9.3.7J.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22.

2. Set Ack/Nack handling at the SS such that regardless of the response from the UE (Ack, Nack or DTX) new data is sent each time, this is because HARQ transmissions are set to one, i.e. no re-transmission of failed blocks. The sending of new data means that for each HARQ process the new data indicator bit in the HS-SCCH toggles for consecutive transmissions.

9.3.7J.4.2 Procedure

1. Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with the exceptions for information elements listed in table 9.3.7J.2 and exceptions in Annex I, with levels according to table E.5.4D. Set test conditions according to test 1 according table 9.3.7J.1. The configuration of the downlink channels is defined in table E.5.4D.

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

2. For each stream, the SS shall send TF according to CQI value 6 and keep it regardless of the CQI value sent by the UE. Continue transmission of the HS-PDSCH until 2000 CQI reports have been gathered. In this process the SS collects CQI reports every 2 ms and also cases where UE transmits nothing in its CQI field (CQI0) are counted as CQI reports.
3. Set up a relative frequency distribution for the reported CQI values for each stream. Calculate the median value (Median CQI is the CQI that is at or crosses 50% distribution from the lower CQI side). This CQI-value is declared as Median CQI value for that stream.
4. For each stream, If 1800 or more of the CQI values are in the range (Median CQI - 2) ≤ Median CQI ≤ (Median CQI + 2) then continue with step 5, otherwise fail the UE.

NOTE: The following part of the procedure will test if BLER versus CQI has the correct sense.

5. For each stream ,SS shall transmit the TF according to the median-CQI value and shall not react to the UE's CQI reports. For each stream, for any HSDPA block transmitted by the SS, record the associated ACK, NACK and statDTX responses. The responses are then filtered as follows: for the sequence of responses for each HARQ process, discard all the statDTX responses. If the number of consecutive discarded statDTX for any one process is an odd number including one, also discard the next response for that HARQ process regardless whether it is an ACK or NACK. Continue to gather data until the number of filtered ACK+NACK responses reaches 1000.

For each stream, and for the filtered ACK and NACK responses if the ratio (NACK / ACK + NACK) < 0.1 then goto step 6), otherwise goto step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQIreports. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK /ACK + NACK) ≥ 0.1

   then pass the UE, otherwise fail the UE

7. The SS shall transmit the TF according to the median-CQI-1 value and shall not react to the UE's CQI value. For any HSDPA block, transmitted by the SS, record and filter the ACK, NACK and statDTX responses as in step 5 until 1000 filtered ACK+NACK responses are gathered.

   If the ratio (NACK / ACK + NACK) < 0.1

   then pass the UE, otherwise fail the UE.

NOTE: The statistical selectivity based on 1000 samples is not sufficient to distinguish between BLER < 0.1 and > 0.1. However, it is assumed that the difference between

[true BLER on Median CQI - true BLER on (Median CQI + 2)] and
[true BLER on Median CQI - true BLER on (Median CQI - 1)]

is large enough to exceed the statistical uncertainty and hence the measurement can indicate the correct sense of BLER.

Table 9.3.7J.2: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Test 1

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
- Precoding weight set restriction	TRUE

9.3.7J.5 Test Requirements

Pass fail decision is as specified in the test procedure in 9.3.7J.4.2

There are no parameters in the test setup or measurement process whose variation impacts the results so there are no applicable test tolerances for this test.

9.4 HS-SCCH Detection Performance

9.4.1 Single Link Performance

9.4.1.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply to all types of UTRA for FDD UE that support HSDPA.

9.4.1.2 Minimum requirements

For the parameters specified in Table 9.4.1.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.1.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.4.1.1: Test parameters for HS-SCCH detection - single link

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c/I_{or}	dB	-10		
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		

Table 9.4.1.2: Minimum requirement for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-9	0	0.05
2	PA3	-9.9	5	0.01
3	VA30	-10	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.1.

9.4.1.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.1.2.

9.4.1.4 Method of test

9.4.1.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2. Set the test parameters for test 1-3 as specified in table 9.4.1.3 and 9.4.1.4. Setup fading simulators as fading condition, which are described in table D.2.2.1A.

9.4.1.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with levels according to table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4 and start transmitting HSDPA Data.

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

9.4.1.5 Test Requirements

Tables 9.4.1.3. and 9.4.1.4 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event $E_m$denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.1.4. The pass/fail decision is done according to Annex F.6.1.

Table 9.4.1.3: Test parameters for HS-SCCH detection - single link

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c/I_{or}	dB	-9.9		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
MAC-d PDU size	Bits	112		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Number of HARQ processes		2		

Table 9.4.1.4: Test requirement for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-8.9	0.6	0.05
2	PA3	-9.8	5.6	0.01
3	VA30	-9.9	0.6	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

9.4.1A Single Link Performance - Enhanced Performance Requirements Type 1

9.4.1A.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 6 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 1.

The requirements and this test apply also for Release 7 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 8 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 3i.

9.4.1A.2 Minimum requirements

For the parameters specified in Table 9.4.1A.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.1A.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.4.1A.1: Test parameters for HS-SCCH detection - single link

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c/I_{or}	dB	-10		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		

Table 9.4.1A.2: Minimum requirement for Enhanced performance requirements type 1 for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-12.0	0	0.01
2	VA30	-15.6	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.1.

9.4.1A.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.1A.2.

9.4.1A.4 Method of test

9.4.1A.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 simulators and AWGN noise sources to the UE antenna connector(s) as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2. Set the test parameters for test 1-2 as specified in table 9.4.1A.3 and 9.4.1A.4. Setup fading simulators as fading condition, which are described in table D.2.2.1A and for UEs that support receive diversity as also described in clause D.2.5.

9.4.1A.4.2 Procedure

1. The UE is switched on.
2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with levels according to table E.5.0.
3. Once the HSDPA connection is setup, change levels according to Table E.5.4 and start transmitting HSDPA Data.
4. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

9.4.1A.5 Test Requirements

Tables 9.4.1A.3. and 9.4.1A.4 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.1A.4. The pass/fail decision is done according to Annex F.6.1.

Table 9.4.1A.3: Test parameters for HS-SCCH detection - single link

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c/I_{or}	dB	-9.9		
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
MAC-d PDU size	Bits	112		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Number of HARQ processes		2		

Table 9.4.1A.4: Test requirement for Enhanced performance requirements type 1 for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-11.9	0.6	0.01
2	VA30	-15.5	0.6	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.

9.4.2 Open Loop Diversity Performance

9.4.2.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 6 and later to all types of UTRA for FDD UE that support HSDPA.

9.4.2.2 Minimum requirements

For the test parameters specified in Table 9.4.2.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.2.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.4.2.1: Test parameters for HS-SCCH detection - open loop diversity

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c/I_{or}	dB	-10		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		

Table 9.4.2.2: Minimum requirement for HS-SCCH detection - open loop diversity

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} **(dB)**	$\hat{I}_{or}/I_{oc}$ **(dB)**	$P(E_m)$
1	PA3	-11.6	0	0.05
2	PA3	-13.4	5	0.01
3	VA30	-11.5	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.2.

9.4.2.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.2.2.

9.4.2.4 Method of test

9.4.2.4.1 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, multipath fading simulators and AWGN noise sources to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.22 does not need to be used.

2. Set the test parameters for test 1-3 as specified in table 9.4.2.4 and 9.4.2.5. Setup fading simulators as fading condition, which are described in table D.2.2.1A and clause D.2.7.

9.4.2.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.2.3, with levels according to table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4A and start transmitting HSDPA Data.

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

Table 9.4.2.3: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.4.2.5 Test Requirements

Tables 9.4.2.4. and 9.4.2.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.2.5. The pass/fail decision is done according to Annex F.6.1.

Table 9.4.2.4: Test parameters for HS-SCCH detection - open loop diversity

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c / I_{or}	dB	-9.9		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
MAC-d PDU size	Bits	112		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.		
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.		
Number of HARQ processes		2		

Table 9.4.2.5: Test requirement for HS-SCCH detection - open loop diversity

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-11.5	0.8	0.05
2	PA3	-13.3	5.8	0.01
3	VA30	-11.4	0.8	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.

9.4.2A Open Loop Diversity Performance - Enhanced Performance Requirements Type 1

9.4.2A.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 6 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 1.

The requirements and this test apply also for Release 7 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 3.

The requirements and this test apply also for Release 8 and later to all types of UTRA for FDD UE that support HSDPA and the optional enhanced performance requirements type 3i.

9.4.2A.2 Minimum requirements

For the test parameters specified in Table 9.4.2A.1, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.2A.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$.

Table 9.4.2A.1: Test parameters for HS-SCCH detection - open loop diversity

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or}	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		TF corresponding to CQI1	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.2A.2: Minimum requirement for Enhanced performance requirements type 1 for HS-SCCH detection - open loop diversity

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.2	0	0.01
2	VA30	-16.4	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.2.

9.4.2A.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.2A.2.

9.4.2A.4 Method of test

9.4.2A.4.1 Initial conditions

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

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

1. Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.
2. Set the test parameters for test 1-2 as specified in table 9.4.2A.4 and 9.4.2A.5. Setup fading simulators as fading condition, which are described in table D.2.2.1A and clause D.2.5. The configuration of the downlink channels is defined in table E.5.4A.

9.4.2A.4.2 Procedure

1. The UE is switched on.
2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.2A.3, with levels according to table E.5.0.
3. Once the HSDPA connection is setup, change levels according to Table E.5.4A and start transmitting HSDPA Data.
4. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

Table 9.4.2A.3: Specific Message Contents for open-loop transmit diversity mode

SYSTEM INFORMATION BLOCK TYPE5

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

SYSTEM INFORMATION BLOCK TYPE11

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

RRC CONNECTION SETUP

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

RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

9.4.2A.5 Test Requirements

Tables 9.4.2A.4. and 9.4.2A.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.2A.5. The pass/fail decision is done according to Annex F.6.1.

Table 9.4.2A.4: Test parameters for HS-SCCH detection - open loop diversity

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or}	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		TF corresponding to CQI1	
MAC-d PDU size	Bits	112	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	
Number of HARQ processes		2	

Table 9.4.2A.5: Test requirement for Enhanced performance requirements type 1 for HS-SCCH detection - open loop diversity

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.1	0.8	0.01
2	VA30	-16.3	0.8	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.

9.4.3 HS-SCCH Type 3 Performance

9.4.3.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 7 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 - 18.

9.4.3.2 Minimum requirements

For the test parameters specified in Table 9.4.3.1 with the downlink physical channel setup in Table E.5.4A, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.3.2 and Table 9.4.3.3 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.3.2 and Table 9.4.3.3 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.3.2 assumes HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH. The requirements in Table 9.4.3.3 assumes HS-SCCH Type 3 coding associated with dual stream transmission on HS-DSCH. Minimum performance requirements specified in Table 9.4.3.2 and 9.4.3.3 are based on receiver diversity.

Table 9.4.3.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		<u>In case one transport block is signalled on HS-SCCH:</u> One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. <u>In case two transport blocks are signalled on HS-SCCH:</u> Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3.2: Minimum requirement for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.6	0	0.01
2	VA3	-16.8	0	0.01

Table 9.4.3.3: Minimum requirement for HS-SCCH Type 3 detection, dual transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
3	PA3	-14.7	0	0.01
4	VA3	-16.0	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.3.

9.4.3.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.3.2 for the single transport block case, and in table 9.4.3.3 for the dual transport block case.

9.4.3.4 Method of test

9.4.3.4.1 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 noise source to the UE antenna connector as shown in figure A.22.
2) Set the test parameters for test 1-4 as specified in table 9.4.3.5. Setup fading simulators as fading condition, which are described in table s D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4A.

9.4.3.4.2 Procedure

1. The UE is switched on.
2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.3.4, with levels according to table E.5.0.
3. Once the HSDPA connection is setup, change levels according to Table E.5.4A and start transmitting HSDPA Data.
4. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

Table 9.4.3.4: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.4.3.5 Test Requirements

Tables 9.4.3.5 to 9.4.3.7 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.3.6 for single transport block case and the specified value in table 9.4.3.7 for dual transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.3.5: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		<u>In case one transport block is signalled on HS-SCCH:</u> One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. <u>In case two transport blocks are signalled on HS-SCCH:</u> Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3.6: Test requirement for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.5	0.8	0.01
2	VA3	-16.7	0.8	0.01

Table 9.4.3.7: Test requirement for HS-SCCH Type 3 detection, dual transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
3	PA3	-14.6	0.8	0.01
4	VA3	-15.9	0.8	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.

9.4.3A HS-SCCH Type 3 Performance -STTD disabled- Asymmetric CPICHs

9.4.3A.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support HSDPA UE capability categories 15 - 20.

NOTE: This test case can be optionally executed for Rel-7 and onward UE's supporting MIMO feature.

9.4.3A.2 Minimum requirements

For the test parameters specified in Table 9.4.3A.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.3A.2 and Table 9.4.3A.3 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.3A.2 and Table 9.4.3A.3 assume STTD is disabled on HS-SCCH and DPCH. The requirements in Table 9.4.3A.2 assumes HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH. The requirements in Table 9.4.3A.3 assumes HS-SCCH Type 3 coding associated with dual stream transmission on HS-DSCH. Minimum performance requirements specified in Table 9.4.3A.2 and 9.4.3A.3 are based on receiver diversity.

Table 9.4.3A.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		<u>In case one transport block is signalled on HS-SCCH:</u> One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. <u>In case two transport blocks are signalled on HS-SCCH:</u> Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3A.2: Minimum requirement for HS-SCCH Type 3 detection, STTD disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-12.3	0	0.01
2	VA3	-14.9	0	0.01

Table 9.4.3A.3: Minimum requirement for HS-SCCH Type 3 detection, STTD disabled, dual transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
3	PA3	-11.4	0	0.01
4	VA3	-14.2	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.3.

9.4.3A.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.3A.2 for the single transport block case, and in table 9.4.3A.3 for the dual transport block case.

9.4.3A.4 Method of test

9.4.3A.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 noise source to the UE antenna connector as shown in figure A.22.

2) Set the test parameters for test 1-4 as specified in table 9.4.3A.5. Setup fading simulators as fading condition, which are described in tables D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4E.

9.4.3A.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.3A.4, with levels according to table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.

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

Table 9.4.3A.4: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
Precoding weight set restriction	Not Present

9.4.3A.5 Test Requirements

Tables 9.4.3A.5 to 9.4.3A.7 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.3A.6 for single transport block case and the specified value in table 9.4.3A.7 for dual transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.3A.5: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		<u>In case one transport block is signalled on HS-SCCH:</u> One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. <u>In case two transport blocks are signalled on HS-SCCH:</u> Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3A.6: Test requirement for HS-SCCH Type 3 detection, STTD disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-12.2	0.8	0.01
2	VA3	-14.8	0.8	0.01

Table 9.4.3A.7: Test requirement for HS-SCCH Type 3 detection, STTD disabled, dual transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
3	PA3	-11.3	0.8	0.01
4	VA3	-14.1	0.8	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.

9.4.3B HS-SCCH Type 3 Performance -STTD enabled- Asymmetric CPICHs

9.4.3B.1 Definition and applicability

The detection performance of the HS-SCCH is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for HSDPA UE capability categories 15 - 20 and Release 10 and later for all types of UTRA for the FDD UE's supporting TX Diversity on DL Control Channels by MIMO Capable UE when MIMO operation is active

NOTE: This test case can be optionally executed for Rel-7 and onward UE's supporting MIMO feature.

9.4.3B.2 Minimum requirements

For the test parameters specified in Table 9.4.3B.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.3B.2 and Table 9.4.3B.3 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.3B.2 and Table 9.4.3B.3 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.3B.2 assumes HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH. The requirements in Table 9.4.3B.3 assumes HS-SCCH Type 3 coding associated with dual stream transmission on HS-DSCH. Minimum performance requirements specified in Table 9.4.3B.2 and 9.4.3B.3 are based on receiver diversity.

Table 9.4.3B.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		In case one transport block is signalled on HS-SCCH: One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. In case two transport blocks are signalled on HS-SCCH: Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3B.2: Minimum requirement for HS-SCCH Type 3 detection, STTD enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.3	0	0.01
2	VA3	-16.7	0	0.01

Table 9.4.3B.3: Minimum requirement for HS-SCCH Type 3 detection, STTD enabled, dual transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
3	PA3	-14.4	0	0.01
4	VA3	-15.8	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.3.

9.4.3B.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in table 9.4.3B.2 for the single transport block case, and in table 9.4.3B.3 for the dual transport block case.

9.4.3B.4 Method of test

9.4.3B.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 noise source to the UE antenna connector as shown in figure A.22.

2) Set the test parameters for test 1-4 as specified in table 9.4.3B.5. Setup fading simulators as fading condition, which are described in table s D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4E.

9.4.3B.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.3B.4, with levels according to table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.

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

Table 9.4.3B.4: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
Precoding weight set restriction	Not Present

RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/1
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
Precoding weight set restriction	Not Present

9.4.3B.5 Test Requirements

Tables 9.4.3B.5 to 9.4.3B.7 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in table 9.4.3B.6 for single transport block case and the specified value in table 9.4.3B.7 for dual transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.3B.5: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I_{oc}	dBm/3.84 MHz	-60			
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010			
HS-DSCH TF of UE1		In case one transport block is signalled on HS-SCCH: One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options. In case two transport blocks are signalled on HS-SCCH: Two transport blocks with the same size and same number of OVSF codes as used in the case of transmitting only one transport block. Precoding matrix applied to HS-PDSCH shall cycle through the four possible options.			
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.			
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.			
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.			

Table 9.4.3B.6: Test requirement for HS-SCCH Type 3 detection, STTD enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.2	0.8	0.01
2	VA3	-16.6	0.8	0.01

Table 9.4.3B.7: Test requirement for HS-SCCH Type 3 detection, STTD enabled, dual transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
3	PA3	-14.3	0.8	0.01
4	VA3	-15.7	0.8	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.

9.4.4 HS-SCCH Type 3 Performance for MIMO only with single-stream restriction

9.4.4.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support the optional MIMO only with single stream restriction.

NOTE: This test case can be optionally tested for Rel-7 and onward UE's supporting MIMO feature.

9.4.4.2 Minimum requirements

For the test parameters specified in Table 9.4.4.1 with the downlink physical channel setup in Table E.5.4A, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4.2 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.4.2 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH.

Table 9.4.4.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c / I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4.2: Minimum requirement for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-8.9	0	0.01
2	VA3	-11.0	0	0.01

Table 9.4.4.3: Void

The reference for this requirement is TS 25.101 [1] clause 9.4.4.

9.4.4.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4.2 for the single transport block case.

9.4.4.4 Method of test

9.4.4.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in Table 9.4.4.5. Setup the fading simulators as fading condition, which are described in table s D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in Table E.5.4A.

9.4.4.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in Table 9.4.4.4, with levels according to Table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4A and start transmitting HSDPA Data.

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

Table 9.4.4.4: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters - MIMO operation - MIMO N_cqi_typeA/M_cqi ratio - MIMO pilot configuration - CHOICE *Second CPICH pattern* >Antenna2 P-CPICH - Precoding weight set restriction	 Start 1/2 Not Present

9.4.4.5 Test Requirements

Tables 9.4.4.5 to 9.4.4.6 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4.6 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4.5: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4.6: Test requirement for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-8.8	0.8	0.01
2	VA3	-10.9	0.8	0.01

Table 9.4.4.7: Void

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.

9.4.4A HS-SCCH Type 3 Performance for MIMO only with single-stream restriction- Enhanced Performance Requirements Type 1

9.4.4A.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE's supporting optional MIMO-only with single-stream restriction feature and the optional enhanced performance requirements type1.

NOTE: This test case can be optionally tested for Rel-9 UE's supporting optional MIMO-only with single-stream restriction and the optional enhanced performance requirements type1.

9.4.4A.2 Minimum requirements

For the test parameters specified in Table 9.4.4A.1 with the downlink physical channel setup in Table E.5.4A, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4A.2 and Table 9.4.4A.3 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4A.2 and Table 9.4.4A.3 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.4A.2 and Table 9.4.4A.3 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH. Performance requirements specified in Table 9.4.4A.3 are based on receiver diversity.

Table 9.4.4A.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4A.2: Enhanced requirement type 1 for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.6	0	0.01
2	VA3	-16.8	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.4A.

9.4.4A.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4A.2 and Table 9.4.4A.3 for the single transport block case.

9.4.4A.4 Method of test

9.4.4A.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 noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in table 9.4.4A.5. Setup fading simulators as fading condition, which are described in table s D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4A.

9.4.4A.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.4A.4, with levels according to table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4A and start transmitting HSDPA Data.

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

Table 9.4.4A.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.4.4A.5 Test Requirements

Tables 9.4.4A.5 to 9.4.4A.7 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4A.6 and Table 9.4.4A.7 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4A.4: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4A.5: Test enhanced requirement type 1 for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.5	0.8	0.01
2	VA3	-16.7	0.8	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.

9.4.4B HS-SCCH Type 3 Performance for MIMO only with single-stream restriction-STTD disabled-asymmetric CPICHs

9.4.4B.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction-STTD disabled-asymmetric CPICHs is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support the optional MIMO only with single stream restriction.

NOTE: This test case can be optionally executed for Rel-7 and onward UE's supporting MIMO feature.

9.4.4B.2 Minimum requirements

For the test parameters specified in Table 9.4.4B.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4B.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4B.2 assume STTD is disabled on HS-SCCH and DPCH. The requirements in Table 9.4.4B.2 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH.

Table 9.4.4B.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4B.2: Minimum requirement for HS-SCCH Type 3 detection, STTD-disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-11.0	3	0.05
2	VA3	-8.7	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.4.

9.4.4B.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4B.2 for the single transport block case.

9.4.4B.4 Method of test

9.4.4B.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in Table 9.4.4B.4. Setup the fading simulators as fading condition, which are described in Tables D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in Table E.5.4E.

9.4.4B.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in Table 9.4.4B.3, with levels according to Table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.

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

Table 9.4.4B.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	½
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.4.4B.5 Test Requirements

Tables 9.4.4B.4 to 9.4.4B.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4B.5 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4B.4: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4B.5: Test requirement for HS-SCCH Type 3 detection, STTD-disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-10.9	3.8	0.05
2	VA3	-8.6	0.8	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.

9.4.4C HS-SCCH Type 3 Performance for MIMO only with single-stream restriction-STTD disabled-asymmetric CPICHs- Enhanced Performance Requirements Type 1

9.4.4C.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction-STTD disabled-asymmetric CPICHs is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE's supporting the optional MIMO-only with single-stream restriction feature and the optional enhanced performance requirements type1.

NOTE: This test case can be optionally tested for Rel-9 UE's supporting optional MIMO-only with single-stream restriction feature and the optional enhanced performance requirements type1.

9.4.4C.2 Minimum requirements

For the test parameters specified in Table 9.4.4C.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4C.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4C.2 assume STTD is disabled on HS-SCCH and DPCH. The requirements in Table 9.4.4C.2 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH.

Table 9.4.4C.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4C.2: Enhanced requirement type 1 for HS-SCCH Type 3 detection, STTD disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-12.3	0	0.01
2	VA3	-14.9	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.4.

9.4.4C.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4C.2 for the single transport block case.

9.4.4C.4 Method of test

9.4.4C.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in table 9.4.4C.4. Setup fading simulators as fading condition, which are described in Tables D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4E.

9.4.4C.4.2 Procedure

1. The UE is switched on.
2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.4C.3, with levels according to table E.5.0.
3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.
4. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

Table 9.4.4C.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters - MIMO operation - MIMO N_cqi_typeA/M_cqi ratio - MIMO pilot configuration - CHOICE *Second CPICH pattern* >Antenna2 P-CPICH - Precoding weight set restriction	 Start ½ Not Present

9.4.4C.5 Test Requirements

Tables 9.4.4C.4 to 9.4.4C.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4C.5 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4C.4: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c / I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4C.5: Enhanced requirement type 1 for HS-SCCH Type 3 detection, STTD disabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-12.3	0.8	0.01
2	VA3	-14.9	0	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.

9.4.4D HS-SCCH Type 3 Performance for MIMO only with single-stream restriction-STTD enabled-asymmetric CPICHs

9.4.4D.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction-STTD enabled-asymmetric CPICHs is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE that support the optional TX Diversity on DL Control Channels and the optional MIMO only with single stream restriction.

NOTE: This test case can be optionally executed for Rel-7 and onward UE's supporting MIMO feature.

9.4.4D.2 Minimum requirements

For the test parameters specified in Table 9.4.4D.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4D.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4D.2 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.4D.2 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH.

Table 9.4.4D.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4D.2: Minimum requirement for HS-SCCH Type 3 detection, STTD-enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-8.4	0	0.01
2	VA3	-11.1	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.4.

9.4.4D.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4D.2 for the single transport block case.

9.4.4D.4 Method of test

9.4.4D.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in Table 9.4.4D.4. Setup the fading simulators as fading condition, which are described in Tables D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in Table E.5.4E.

9.4.4D.4.2 Procedure

1. The UE is switched on.

2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in Table 9.4.4D.3, with levels according to Table E.5.0.

3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.

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

Table 9.4.4D.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
- MIMO N_cqi_typeA/M_cqi ratio	½
- MIMO pilot configuration	
- CHOICE *Second CPICH pattern*	
>Antenna2 P-CPICH	
- Precoding weight set restriction	Not Present

9.4.4D.5 Test Requirements

Tables 9.4.4D.4 to 9.4.4D.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4D.5 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4D.4: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4D.5: Test requirement for HS-SCCH Type 3 detection, STTD-enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-8.3	0.8	0.01
2	VA3	-11.0	0.8	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.

9.4.4E HS-SCCH Type 3 Performance for MIMO only with single-stream restriction-STTD enabled-asymmetric CPICHs- Enhanced Performance Requirements Type 1

9.4.4E.1 Definition and applicability

The detection performance of the HS-SCCH for MIMO only with single-stream restriction-STTD enabled-asymmetric CPICHs is determined by the probability of event E_m, which is declared when the UE is signalled on HS-SCCH-1, but DTX is observed in the corresponding HS-DPCCH ACK/NACK field. The probability of event E_m is denoted $P(E_m)$.

The requirements and this test apply for Release 10 and later for all types of UTRA for the FDD UE's supporting optional Tx Diversity on DL Control channels and the optional MIMO-only with single-stream restriction feature and the optional enhanced performance requirements type1.

NOTE: This test case can be optionally tested for Rel-9 UE's supporting optional Tx diversity on DL Control channels and supporting optional MIMO-only with single-stream restriction feature and the optional enhanced performance requirements type1

9.4.4E.2 Minimum requirements

For the test parameters specified in Table 9.4.4E.1 with the downlink physical channel setup in Table E.5.4E, for each value of HS-SCCH-1 E_c/I_{or} specified in Table 9.4.4E.2 the measured $P(E_m)$ shall be less than or equal to the corresponding specified value of $P(E_m)$. The requirements in Table 9.4.4E.2 assume STTD is enabled on HS-SCCH and DPCH. The requirements in Table 9.4.4E.2 assume HS-SCCH Type 3 coding associated with single stream transmission on HS-DSCH.

Table 9.4.4E.1: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-10	
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4E.2: Enhanced requirement type 1 for HS-SCCH Type 3 detection, STTD enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.3	0	0.01
2	VA3	-16.7	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.4.4.

9.4.4E.3 Test purpose

To verify that $P(E_m)$ does not exceed the limit in Table 9.4.4E.2 for the single transport block case.

9.4.4E.4 Method of test

9.4.4E.4.1 Initial conditions

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

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

1) Connect SS, multipath fading simulator and an AWGN noise source to the UE antenna connector as shown in figure A.22 for UEs that support receive diversity or figure A.12 for UEs that do not support receive diversity.

2) Set the test parameters for test 1-2 as specified in table 9.4.4E.4. Setup fading simulators as fading condition, which are described in table s D.2.2.1A and D.2.2.1C and clause D.2. The configuration of the downlink channels is defined in table E.5.4E.

9.4.4E.4.2 Procedure

1. The UE is switched on.
2. Set up a HSDPA connection with looping back 12.2kbps RMC according to the generic HSDPA set-up procedure specified in TS 34.108 [3] sub clause 7.3.6 with the exceptions for information elements listed in table 9.4.4E.3, with levels according to table E.5.0.
3. Once the HSDPA connection is setup, change levels according to Table E.5.4E and start transmitting HSDPA Data.
4. Count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.1 and table F.6.1.8. NACK and ACK are counted as a pass and statDTX is counted as a failure.

Table 9.4.4E.3: Specific Message Contents for MIMO

RADIO BEARER SETUP for HSDPA Tests 1 & 2

Information Element	Value/remark
MIMO parameters - MIMO operation - MIMO N_cqi_typeA/M_cqi ratio - MIMO pilot configuration - CHOICE *Second CPICH pattern* >Antenna2 P-CPICH - Precoding weight set restriction	 Start ½ Not Present

9.4.4E.5 Test Requirements

Tables 9.4.4E.4 to 9.4.4E.5 define the primary level settings including test tolerance and test parameters for relevant tests. The probability of event E_m denoted as $P(E_m)$ (test procedure step 3) shall not exceed the specified value in Table 9.4.4E.5 for single transport block case. The pass/fail decision is done according to Annex F.6.1. IE's for

Table 9.4.4E.4: Test parameters for HS-SCCH Type 3 detection

Parameter	Unit	Test 1	Test 2
I_{oc}	dBm/3.84 MHz	-60	
Phase reference	-	P-CPICH	
P-CPICH E_c/I_{or} (*)	dB	-9.9	
HS-SCCH UE Identity ($x_{ue,1}, x_{ue,2}, \ldots, x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010 HS-SCCH-3: 0001101010101010 HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1 Precoding vector applied to HS-PDSCH shall cycle through the four possible options.	
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.	
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH-1 signalling pattern shall be "…XOOXOO…", where "X" indicates TTI in which the HS-SCCH-1 uses the identity of the UE under test, and "O" indicates TTI in which the HS-SCCH-1 uses a different UE identity.	

Table 9.4.4E.5: Enhanced requirement type 1 for HS-SCCH Type 3 detection, STTD enabled, single transport block case with downlink physical channel setup in Table E.5.4E

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	$P(E_m)$
1	PA3	-15.3	0.8	0.01
2	VA3	-16.7	0.8	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.

9.5 HS-SCCH-less demodulation of HS-DSCH (Fixed Reference Channel)

During the Fixed Reference Channel tests the behaviour of the Node-B emulator in response to the ACK/NACK signalling field of the HS-DPCCH is specified in Table 9.2.4.

Performance requirements in this section assume sufficient power allocation to HS-SCCH_1, so that the probability of detection failure, when the HS-SCCH-1 uses the identity of the UE under test, is very low.

9.5.1 Requirement QPSK, Fixed Reference Channel (FRC) H-Set 7

9.5.1.1 Definition and applicability

The receiver performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) with HS-SCCH-less operation in multi-path fading environment is determined by the information bit throughput R.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support the optional HS-SCCH-less HS-DSCH.

9.5.1.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-Set 7 specified in Annex C.8.1.7, with the addition of the parameters in Table 9.5.1.1 and the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in table 9.5.1.2.

Table 9.5.1.1: Test Parameters for Testing QPSK FRC H-Set 7

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence	-	{0,3}
Maximum number of HARQ transmission	-	2
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for redundancy version 3 transmissions intended for the UE.		

Table 9.5.1.2: Minimum requirement, Fixed Reference Channel (FRC) H-Set 7

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	T-put R (kbps)
1	Case 8	-6	0	19.9

The reference for this requirement is TS 25.101 [1] clause 9.5.1.

9.5.1.3 Test purpose

To verify that UE is capable of decoding the HS-PDSCH on the first transmission without the HS-SCCH, and be capable of combining the first transmission and second transmissions. Corresponding throughput requirements are specified.

9.5.1.4 Method of test

9.5.1.4.1 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 (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the test parameters for test 1 according to tables 9.5.1.3 and 9.5.1.4. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (Fixed reference Channel Definition H-Set 7 (QPSK): The information bit payload block is 605 bits long. Hence the PRBSequence must be at least 605 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channel as specified in Annex C.8.1.7.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.B.

9.5.1.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 and start transmitting HSDPA Data.

2) The SS shall count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.7.

Specific Message Contents

All messages indicated above shall use the same content as described in the default message content in clause 9.2.1 of 34.108 [3] with the following exceptions:

RRC CONNECTION SETUP COMPLETE message

Information Element	Value/remark
- HS-SCCHless HS-DSCH operation support	TRUE

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	Not Present
- Added or reconfigured MAC-d flow	
- MAC-hs queue to add or reconfigure list	1
- MAC-d PDU size Info	
- MAC-d PDU size	112 bits
- MAC-d PDU size index	0
HS-SCCH less information - CHOICE *HS-SCCH less operation*	 New HS-SCCH less operation
- HS-PDSCH Code Index - Transport Block Size List	1 1
- Transport Block Size Index - HS-PDSCH Second Code Support	40 Index of "information Bit Payload = 605" of H-Set 7 is defined in Annex A of TS25.321 [13]. FALSE

9.5.1.5 Test Requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 7 specified in Annex C.8.1.7. Tables 9.5.1.3 and 9.5.1.4 define the primary level settings including test tolerance for all relevant throughput tests. Table E.5.6 defines the secondary and subsequently ranked level settings including test tolerance. The pass / fail decision for throughput is done according to Annex F.6.3.

Using this configuration the throughput shall meet or exceed the test requirements specified in table 9.5.1.4.

Table 9.5.1.3: Test Parameters for Testing QPSK FRC H-Set 7

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (No test tolerance applied)
Redundancy and constellation version coding sequence	-	{0,3}
Maximum number of HARQ transmission	-	2
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for redundancy version 3 transmissions intended for the UE.		

Table 9.5.1.4: Test requirement, Fixed Reference Channel (FRC) H-Set 7

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps)
1	Case 8	-5.9	0.6	19.9

9.5.1A Requirement QPSK, Fixed Reference Channel (FRC) H-Set 7 - Enhanced Performance Requirements Type 1

9.5.1A.1 Definition and applicability

The receiver performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) with HS-SCCH-less operation in multi-path fading environment is determined by the information bit throughput R.

The requirements and this test apply to Release 7 and later releases for all types of UTRA for the FDD UE that support the optional HS-SCCH-less HS-DSCH and the optional performance requirements type 1.

9.5.1A.2 Minimum requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channels H-set 7 specified in Annex C.8.1.7, with the addition of the parameters in Table 9.5.1A.1 and the downlink physical channel setup according to table E.5.1.

Using this configuration the throughput shall meet or exceed the minimum requirements specified in table 9.5.1A.2. Enhanced performance requirements type 1 are based on receiver diversity.

Table 9.5.1A.1: Test Parameters for Testing QPSK FRC H-Set 7

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence	-	{0,3}
Maximum number of HARQ transmission	-	2
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for redundancy version 3 transmissions intended for the UE.		

Table 9.5.1A.2: Enhanced requirement type 1, Fixed Reference Channel (FRC) H-Set 7

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	T-put R (kbps)
1	Case 8	-9	0	23.5

The reference for this requirement is TS 25.101 [1] clause 9.5.1.

9.5.1A.3 Test purpose

To verify that UE is capable of decoding the HS-PDSCH on the first transmission without the HS-SCCH, and be capable of combining the first transmission and second transmissions. Corresponding throughput requirements are specified.

9.5.1A.4 Method of test

9.5.1A.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 the SS (node B emulator) and fader and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

2) Set up an HSDPA call with looping back 12.2kbps RMC according to TS 34.108 [3] clause 7.3.6 with levels according to table E.5.0.

3) Set the test parameters for test 1 according to tables 9.5.1A.3 and 9.5.1A.4. The configuration of the downlink channels is defined in table E.5.1.

4) The information bit data shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (Fixed reference Channel Definition H-set 7 (QPSK): The information bit payload block is 605 bits long. Hence the PRBSequence must be at least 605 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27].

5) The SS shall not time the transmission freely. It shall time the transmission strictly according to the reference measurement channel as specified in Annex C.8.1.7.

6) Setup the fading simulator with fading conditions as described in table D.2.2.1.B and for UEs that support receive diversity as also described in clause D.2.5.

9.5.1A.4.2 Procedure

1) Once the HSDPA connection is setup, change levels according to Tables E.5.6 and start transmitting HSDPA Data.

2) The SS shall count the number of NACK, ACK and statDTX on the UL HS-DPCCH during the test interval and decide pass or fail according to Annex F.6.3 tables F.6.3.5.4.8.

Specific Message Contents

All messages indicated above shall use the same content as described in the default message content in clause 9.2.1 of 34.108 [3] with the following exceptions:

RRC CONNECTION SETUP COMPLETE message

Information Element	Value/remark
- HS-SCCHless HS-DSCH operation support	TRUE

RADIO BEARER SETUP message: AM or UM (HSDPA)

Information Element	Value/remark
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	Not Present
- Added or reconfigured MAC-d flow	
- MAC-hs queue to add or reconfigure list	1
- MAC-d PDU size Info	
- MAC-d PDU size	112 bits
- MAC-d PDU size index	0
HS-SCCH less information - CHOICE *HS-SCCH less operation*	 New HS-SCCH less operation
- HS-PDSCH Code Index - Transport Block Size List	1 1
- Transport Block Size Index - HS-PDSCH Second Code Support	40 Index of "information Bit Payload = 605" of H-Set 7 is defined in Annex A of TS25.321 [13]. FALSE

9.5.1A.5 Test Requirements

The requirements are specified in terms of a minimum information bit throughput R for the DL reference channel H-Set 7 specified in Annex C.8.1.7. Tables 9.5.1A.3 and 9.5.1A.4 define the primary level settings including test tolerance for all relevant throughput tests. Table E.5.6 defines the secondary and subsequently ranked level settings including test tolerance. The pass / fail decision for throughput is done according to Annex F.6.3.

Using this configuration the throughput shall meet or exceed the test requirements specified in table 9.5.1A.4.

Table 9.5.1A.3: Test Parameters for Testing QPSK FRC H-Set 7

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I_{oc}	dBm/3.84 MHz	-60 (no test tolerance applied)
Redundancy and constellation version coding sequence	-	{0,3}
Maximum number of HARQ transmission	-	2
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for redundancy version 3 transmissions intended for the UE.		

Table 9.5.1A.4: Test requirement, Enhanced requirement type 1, Fixed Reference Channel (FRC) H-Set 7

Test Number	Propagation Conditions	Reference value		
		HS-PDSCH E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	T-put R (kbps)
1	Case 8	-8.9	0.6	23.5

9.6 HS-DSCH and HS-SCCH reception in CELL-FACH state

9.6.1 Single link HS-DSCH Demodulation performance in CELL_FACH state

9.6.1.1 Definition and applicability

The receiver single link performance of the High Speed Physical Downlink Shared Channel (HS-DSCH) is determined by the RLC SDU error rate (RLC SDU ER).

The requirements apply to Release 7 and later releases for all types of UTRA FDD UEs, being able to receive HS-DSCH and HS-SCCH in CELL_FACH state.

9.6.1.2 Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

The requirements are specified in terms of a minimum RLC SDU error rate (RLC SDU ER) for the DL reference channel H-Set 3 (QPSK version) specified in C.8.1.3 with the addition of the parameters in Table 9.6.1.1 and the downlink physical channel setup according to table E.5.4C. For the test parameters specified in Table 9.6.1.1, for the value of HS-DSCH-1 E_c/I_{or} specified in Table 9.6.1.3 the measured RLC SDU ER shall be less than or equal to the corresponding specified value of RLC SDU ER.

Table 9.6.1.1: Test Parameters for Testing QPSK FRCs H-Set 3

Parameter	Unit	Test 1
Phase reference		P-CPICH
I_{oc}	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2,5,6}
Number of HARQ transmission		4
NOTE 1: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE. NOTE 2: The HS-PDSCH is transmitted using all four HARQ transmissions cycling through the different redundancy and constellation versions.		

Table 9.6.1.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	RLC SDU ER $\hat{I}_{or} / I_{oc}$ = 0 dB
1	VA30	-6	0.82

The reference for this requirement is TS 25.101 [1] clause 9.6.1.1.

9.6.1.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal in cell FACH state, with SDU error ratio not falling below a specified value.

9.6.1.4 Method of test

Editor's note: This test is not complete

9.6.1.4.1 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 the SS (node B emulator), multipath fading simulator and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

NOTE 1: For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Enter the UE into the CELL_FACH state according to TS 34.108 [3] clause 7.3.12 with levels according to table E.5.0 and enter the UE into loopback test mode 1 with UL RLC SDU size to 64 bits (see note). See TS 34.108 and TS 34.109 for details regarding loopback test mode 1.

3) The information bit data, sent on HS-DSCH, shall be pseudo random and not repeated before 10 different information bit payload blocks are processed. (e.g. Fixed reference Channel Definition H-set 3 (QPSK): The information bit payload block is 3202 bits long. Hence the PRBSequence must be at least 3202 * 10 bits long.) Use a PRBS from ITU-T O.153 Ref [27]

4) Once the HSDPA connection is setup, change levels according to Table E.5.4C and start transmitting HSDPA Data.

NOTE 2: The radio bearer configuration used by TS 34.108 clause 7.3.12 for uplink use TTI=10ms and a payload size of 320 bits. In downlink the SS will transmit a transport block every 2 ms (H-set 3 (QPSK) with Inter-.TTI=1), bit only one new block per HARQ process in 4 transmissions. To be able to loop back all the DL SDUs in the UL, 4 UL RLC SDUs per uplink TTI (4*(UL RLC SDU size + Length Indicator (7 bits) + E-bit (1 bit)) + AMD SDU fixed size (16 bits) < 320 bits) is required assuming a preamble message can be sent every 3rd frame.

9.6.1.4.2 Procedure

1. The SS sends [100] consecutive valid MAC headers and SDUs to the UE. The no of bits in 1 RLC SDU (2963 bits) shall fit into 1 transport block (3202 bits)

2. The SS counts the received RLC SDUs in uplink.

3. The SS accumulates the No of SDUs, sent in step 1 and the No of received SDUs in step 2 after each iteration and calculates the preliminary SDU ER

4. Repeat step 1 to 3, until statistical significance according to Annex F.6.3 achieved.

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 7.3.12 of 34.108 [3], with the following exceptions:

SYSTEM INFORMATION BLOCK TYPE5

Information Element	Value/remark
- AICH Power offset	0 dB

9.6.1.5 Test Requirements

Tables 9.6.1.3 define the primary level settings including test tolerance for SDR error ratio. The pass / fail decision is done according to Annex F.6.3.

Tables 9.6.1.4 define the secondary and subsequently ranked level settings including test tolerance.

Table 9.6.1.3: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

Test Number	Propagation Conditions	Reference value	
		HS-PDSCH E_c / I_{or} (dB)	RLC SDU ER $\hat{I}_{or} / I_{oc}$ = 0.6 dB
1	VA30	-5.9	0.82

9.6.2 Single link HS-SCCH Detection performance in CELL_FACH state

9.6.2.1 Definition and applicability

The detection performance of the HS-SCCH is determined by RLC SDU error rate (RLC SDU ER).

The requirements apply to Release 7 and later releases for all types of UTRA FDD UEs, being able to receive HS-DSCH and HS-SCCH in CELL_FACH state.

9.6.2.2 Minimum requirement

For the test parameters specified in Table 9.6.2.1, for the value of HS-SCCH-1 E_c/I_{or} specified in Table 9.6.2.2 the measured RLC SDU ER shall be less than or equal to the corresponding specified value of RLC SDU ER. The downlink physical channel setup according to Table E.5.4C.

Table 9.6.2.1: Test parameters for HS-SCCH detection - single link

Parameter	Unit	Test 1	Test 2	Test 3
I_{oc}	dBm/3.84 MHz	-60		
Phase reference	-	P-CPICH		
P-CPICH E_c / I_{or} (*)	Db	-10		
HS-SCCH UE Identity ($x_{ue,1}$, $x_{ue,2}$, …, $x_{ue,16}$)		HS-SCCH-1: 1010101010101010 (UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 0001001010101010		
HS-DSCH TF of UE1		TF corresponding to CQI1		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted continuously with constant power.		
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted continuously with constant power, without re-transmissions.		
HS-SCCH-1 TTI Signalling Pattern	-	The identity of the UE under test shall be used on every fourth TTI.		

Table 9.6.2.2: Minimum requirement for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c / I_{or} (dB)	$\hat{I}_{or} / I_{oc}$ (dB)	RLC SDU ER
3	VA30	-10	0	0.01

The reference for this requirement is TS 25.101 [1] clause 9.6.2.1.

9.6.2.3 Test purpose

To verify the ability of the receiver to receive a predefined test signal in cell FACH state, with SDU error ratio not falling below a specified value.

9.6.2.4 Method of test

Editor's note: This test is not complete

9.6.2.4.1 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 the SS (node B emulator), multipath fading simulator and AWGN noise source to the UE antenna connector as shown in figure A.21 for UEs that support receive diversity or figure A.10 for UEs that do not support receive diversity.

NOTE: For a transition period of two meeting cycles until RAN#60, figure A.21 does not need to be used.

2) Enter the UE into the CELL_FACH state according to TS 34.108 [3] clause 7.3.12 with levels according to table E.5.0 and enter the UE into loopback test mode 1 with UL RLC SDU size to 64 bits (see note). See TS 34.108 and TS 34.109 for details regarding loopback test mode 1.

3) The SS shall transmit the TF according to the CQI1 value defined in TS 25.214. HS-PDSCH is transmitted without HARQ transmissions.

4) Once the HSDPA connection is setup, change levels according to Table E.5.4C and start transmitting HSDPA Data. The HS-PDSCH_Ec/Ior shall be set to -2.9 dB to guarantee zero BLER on the HS-PDSCH.

NOTE: The radio bearer configuration used by TS 34.108 clause 7.3.12 for uplink use TTI=10ms and a payload size of 320 bits. In downlink the SS will transmit a new transport block every fourth TTI with no re-transmissions . To be able to loop back all the DL SDUs in the UL, 4 UL RLC SDUs per uplink TTI (4*(UL RLC SDU size + Length Indicator (7 bits) + E-bit (1 bit)) + AMD SDU fixed size (16 bits) < 320 bits) is required assuming a preamble message can be sent every 3rd frame.

9.6.2.4.2 Procedure

1. The SS sends [100] consecutive valid MAC headers and SDUs to the UE. The no of bits in 1 RLC SDU (2963 bits) shall fit into 1 transport block (3202 bits)

2. The SS counts the received RLC SDUs in uplink.

3. The SS accumulates the No of SDUs, sent in step 1 and the No of received SDUs in step 2 after each iteration and calculates the preliminary SDU ER

4. Repeat step 1 to 3, until statistical significance according to Annex F.6.3 achieved.

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 7.3.12 of 34.108 [3], with the following exceptions:

SYSTEM INFORMATION BLOCK TYPE5

Information Element	Value/remark
- AICH Power offset	0 dB

9.6.2.5 Test Requirements

Table 9.6.2.3 define the primary level settings including test tolerance for SDR error ratio. The pass / fail decision is done according to Annex F.6.3.

Tables 9.6.2.4 define the secondary and subsequently ranked level settings including test tolerance.

Table 9.6.2.3: Test requirement for HS-SCCH detection - single link

Test Number	Propagation Conditions	Reference value		
		HS-SCCH-1 E_c/I_{or} (dB)	$\hat{I}_{or}/I_{oc}$ (dB)	RLC SDU ER
3	VA30	-9.9	0.6	0.01