# 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, the UE shall be tested according to this enhanced performance requirement, the UE shall be tested according to this enhanced performance requirement, the UE shall be tested according to this enhanced performance requirement, the UE shall be tested according to both type3 and type 3 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.

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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 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 3 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.

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 de	etection for single link are dete	ermined in Table 9.4.1.2 and 1	for open loop transmit			
diversity in Table 9.4.2.2.						

Table 9	2.1:	FRC fo	r minimum	performance	requirements for	different	HS-DSCH	categories
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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 enha	nced performance requireme	nts 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 9.2.2: FRC for enhanced performance requirements type 1 for different HS-DSCH categories

# 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	Closed Loop Diversity			
			(Note 2)	(Note 3)			
Ca	ategory 7	H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3			
Ca	ategory 8	H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3			
Ca	ategory 9	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-set 6, H-Set 3			
Ca	tegory 10	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-set 6, H-Set 3			
Ca	tegory 13	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 6, H-Set 3			
Ca	tegory 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 enha dB and 8 dB and Single link enha 18 dB is set acc Single link enha $\hat{I}_{or}/I_{oc} = 10$ dB a minimum perfor	anced performance requiremen e set according to H-Set 10. anced performance requiremen cording to H-Set 8. anced performance requiremen re set according to H-Set 6. Re mance requirements.	ts type 2 for Categories 9, 10 ts type 2 for Categories 13 a ts type 2 for Categories 7, 8, quirements in other condition	), 13 and 14 with $I_{or} / I_{oc} = 4$ and 14 with $\hat{I}_{or} / I_{oc} = 15$ and , 9, 10, 13 and 14 with ans are according to H-Set 3			
NOTE 2:	Open loop trans requirements.	smit diversity requirements are	set according to H-Set 3 mir	nimum performance			
NOTE 3:	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 $I_{or}/I_{oc}$ =10dB and $E_c/I_{or}$ =-3dB are set according to H-Set 6.						
NOTE 4:	Requirements in other conditions are set according to H-Set 3 minimum performance requirements. 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.						

HS-D	SCH	Corresponding requirement				
categ	gory	Single Link	Open Loop Closed Loop		MIMO	
		(Note 1)	Diversity	Diversity	(Note 4)	
			(Note 2)	(Note 3)		
Categ	ory 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Categ	ory 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Categ	ory 9	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Catego	ory 10	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Catego	ory 13	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Catego	ory 14	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A	
Catego	ory 15	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9	
Catego	ory 16	H-Set 10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9	
Catego	ory 17	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9	
Catego	ory 18	H-Set 10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9	
Catego	ory 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	
Catego	ory 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 lin and 8 dE Single lin	nk enhanced performar 3 are set according to H nk enhanced performar	nce requirements f I-Set 10. Ince requirements f	type 3 for Categories type 3 for Categories	5 9, 10, 13 - 20 with $\hat{I}_{or} / I_{oc} = 4 \text{ dB}$ 5 13, 14, 17 - 20 with $\hat{I}_{or} / I_{oc} = 15$	
	Single li	nk enhanced performar	nce requirements t	type 3 for Categories	$\hat{I}_{or}/I_{oc} = 10 \text{ dB}$	
<ul> <li>and Î<sub>or</sub> / I<sub>oc</sub> =5dB are set according to H-Set 6. Requirements in other conditions are according to H-Set 3 type1 enhanced performance requirements.</li> <li>NOTE 2: Open loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.</li> <li>NOTE 3: Closed loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.</li> </ul>						
NOTE 4:	MIMO re	AIMO requirements for categories 15-20, with $\hat{I}_{or}/I_{oc}$ = 6 and 10 dB are set according to H-Set 9.MIMO				
NOTE 5:	requirements for categories 19-20, with $\hat{I}_{or}/I_{oc}$ = 18 dB are set according to H-Set 11. : 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 determin	supporting MIMO for H led in Tables 9.4.3.2 ar	S-DSCH the required the required to the second seco	irements for HS-SC	CH Type 3 detection are	

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

HS-DS	SCH	Corresponding requirement			
categ	jory	Single Link	Open Loop	Closed Loop	MIMO
		(Note 1)	Diversity	Diversity	(Note 4)
			(Note 2)	(Note 3)	
Categ	ory 7	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Categ	ory 8	H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Categ	ory 9	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Catego	ory 10	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Catego	ory 13	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Catego	ory 14	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	N/A
Catego	ory 15	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Catego	ory 16	H-Set10, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Catego	ory 17	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Catego	ory 18	H-Set10, H-Set 8, H-Set 6, H-Set 3	H-Set 3	H-Set 3	H-Set 9
Catego	ory 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
Catego	ory 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:	Sinale lii	nk enhanced performar	ce requirements	tvpe 3i for Categories	5 7-20 with $\hat{I}$ / I ' = 0dB are set
	accordin	g to H-Set 6. Requirem	ents in other cond	ditions are according	to type 3 enhanced performance
NOTE 2:	Open loo	op transmit diversity rec	uirements are se	t according to H-Set	3 type1 enhanced performance
NOTE 3:	<ul> <li>Closed loop transmit diversity requirements are set according to H-Set 3 type1 enhanced performance requirements.</li> </ul>				
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				
NOTE 5:	requirements for categories 19-20, with $I_{or}/I_{oc}$ = 18 dB are set according to H-Set 11. TE 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				
NOTE 6:	For UE s	In Table 9.4.2A.2. supporting MIMO for HS s 9.4.3.2 and Table 9.4	S-DSCH the requi	rements for HS-SCC	H Type 3 detection are determined

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

# 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	Closed Loop Diversity		
			(Note 2)			
Ca	itegory 21	H-Set-10A, H-Set 6A, H-	H-Set 3A	N/A		
		Set 3A				
Ca	itegory 22	H-Set-10A, H-Set 6A, H-	H-Set 3A	N/A		
		Set 3A				
Ca	itegory 23	H-Set-10A, H-Set 8A, H-	H-Set 3A	N/A		
		Set 6A, H-Set 3A				
Ca	itegory 24	H-Set-10A, H-Set 8A, H-	H-Set 3A	N/A		
		Set 6A, H-Set 3A				
	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 $\hat{I}_{or}/I_{oc} = 10$ dB 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 matrix					
NOTE 2:	OTE 2: Open loop transmit diversity requirements are set according to H-Set 3A minimum performance requirements.					
NOTE 3:	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.					

HS-D	SCH	H Corresponding requirement				
categ	gory	Single Link (Note 1)	Open Loop Diversity (Note 2)	Closed Loop Diversity	MIMO	
Catego	ory 21	H-Set-10A, H-Set 6A H-Set 3A	H-Set 3A	N/A	N/A	
Catego	ory 22	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A	
Catego	ory 23	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A	
Catego	ory 24	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	N/A	
Catego	ory 25	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A	
Catego	ory 26	H-Set-10A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 9A	
Catego	ory 27	H-Set-10A, H-Set 8A, H-Set 6A, H-Set 3A	H-Set 3A	N/A	H-Set 11A, H-Set 9A	
Catego	ory 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 li	nk enhanced performar	nce requirements	type 3 for categories	21, 22, 23, 24, 25, 26, 27 and 28	
	with $\hat{I}_{or}$ /	$I_{oc} = 4 \text{ dB} \text{ and } 8 \text{ dB} \text{ are}$	eset according to	H-Set 10A.		
	Single li	nk enhanced performar	nce requirements	type 3 for categories	$\hat{I}_{or}/I_{oc}$ = 15	
	Single li	nk enhanced performar	nce 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 acco	rding to H-Set 6A.		
	Single lin	k minimum requiremen	ts for categories	21, 22, 23, 24, 25, 2	6, 27 and 28 in other conditions are	
NOTE 2:	Open loo	pp transmit diversity rec	uirements are se	t according to H-Se	t 3A type 1 enhanced performance	
NOTE 3:	For UE s HS-SCC diversity	For UE supporting the enhanced performance requirements type 3 for HS-DSCH the requirements HS-SCCH Type 1 detection for single link are determined in Table 9.4.1A.2 and for open loop transi 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 s	supporting MIMO for HS s 9.4.3.2 and Table 9.4	S-DSCH the requi	rements for HS-SC	CH Type 3 detection are determined	
NOTE 6:	For UE s HS-DSC	upporting the MIMO or H are given in Table T	nly with single-stre BD and TBD and	eam restriction the a for HS-SCCH type 3	dditional minimum requirements for 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-DS	SCH	Corresponding requirement				
categ	jory	Single Link	Open Loop	Closed Loop	MIMO	
		(Note 1)	Diversity	Diversity		
			(Note 2)			
Catego	ory 21	H-Set-10A, H-Set	H-Set 3A	N/A	N/A	
		6A, H-Set 3A				
Catego	ory 22	H-Set-10A, H-Set	H-Set 3A	N/A	N/A	
		6A, H-Set 3A				
Catego	ory 23	H-Set-10A, H-Set	H-Set 3A	N/A	N/A	
		8A, H-Set 6A, H-				
		Set 3A				
Catego	ory 24	H-Set-10A, H-Set	H-Set 3A	N/A	N/A	
		8A, H-Set 6A, H-				
		Set 3A				
Catego	ry 25	H-Set-10A, H-Set	H-Set 3A	N/A	H-Set 9A	
<b>0</b> /		6A, H-Set 3A		N1/A		
Catego	ory 26	H-Set-10A, H-Set	H-Set 3A	N/A	H-Set 9A	
0.1	07	6A, H-Set 3A		N1/A		
Catego	ory 27	H-Set-10A, H-Set	H-Set 3A	N/A	H-Set 11A, H-Set 9A	
		8A, H-Set 6A, H-				
0		Set 3A		N1/A		
Catego	ry 28	H-Set-10A, H-Set	H-Set 3A	N/A	H-Set 11A, H-Set 9A	
		од, п-Sel од, п-				
	<u>Cinala li</u>	Sel SA		to the 2 ifor Cotogo	rice 24 22 22 24 25 26 27	
NOTE I.	Single II	nk enhanced periorm	ance requirement	is type of for Catego	Ties 21, 22, 23, 24, 25, 20, 27	
	and 28	with $I_{or} / I_{oc}$ '= 0dB are	eset according to	H-Set 6A. Requiren	nents in other conditions are	
	accordir	ng to type 3 enhanced	d performance rec	quirements.		
NOTE 2:	Open lo	op transmit diversity r	equirements are	set according to H-S	Set 3 type1 enhanced	
	performance requirements.					
NOTE 3:	For UE :	or 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:	+or UE :	supporting the MIMO	only with single -	stream restriction the	additional minimum	
	requiren	nents for HS-DSCH a	re given in Table	IBD and TBD and f	or 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

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

HS-DS	CH category	(	Corresponding requirement	t		
		Single Link (Note 1)	Open Loop Diversity (Note 2)	Closed Loop Diversity		
Ca	itegory 29	H-Set-10B, H-Set 8B, H- Set 6B, H-Set 3B	H-Set 3B	N/A		
Ca	itegory 31	H-Set-10C, H-Set 8C, H- Set 6C, H-Set 3C	H-Set 3C	N/A		
NOTE 1:	E 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 enha set according to	nced performance requiremen H-Set 6B and H-Set 6C respe	ts type 2 for categories 29 ar actively.	nd 31 with $I_{or}/I_{oc}$ =10dB are		
	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:	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.					

HS-D	SCH	Corresponding requirement			ent
categ	gory	Single Link	Open Loop	Closed Loop	MIMO
		(Note 1)	Diversity	Diversity	
Cotog	00/20			N1/A	NI/D
Calego	01y 29		H-Sel SD	N/A	IN/D
		3B			
Categ	ory 30	H-Set-10B, H-Set	H-Set 3B	N/A	H-Set 11B, H-Set 9B
		6B, H-Set 8B, H-Set			
		3B			
Catego	ory 31	H-Set 10C, H-Set	H-Set 3C	N/A	N/A
		8C, H-Set 6C, H-			
		Set 3C			
Catego	ory 32	H-Set 10C, H-Set	H-Set 3C	N/A	H-Set 11C, H-Set 9C
		8C, H-Set 6C, H-			
		Set 3C			
NOTE 1:	Single li	nk enhanced performa	nce requirements	type 3i for Categorie	es 29, 30 with $I_{or}/I_{oc}$ '= 0dB are set
	accordin	g to H-Set 6B. Single I	ink enhanced per	ormance requireme	nts type 3i for Categories 31, 32
	with $\hat{I}_{or}$	$I_{oc}$ ' = 0dB are set acco	ording to H-Set 6C	. Requirements in o	ther conditions are according to
	type 3 er	nhanced performance	requirements.		
NOTE 2:	Öpen lo	op transmit diversity re	quirements are se	t according to H-Set	t 3 type1 enhanced performance
	requirem	ients.			
NOTE 3:	For UE s	supporting the enhance	ed performanœ re	quirements type 3i fo	or HS-DSCH the requirements for
	HS-SCCH Type 1 detection for single link are determined in Table 9.51A and for open loop tran			51A and for open loop transmit	
NOTE	diversity in Table TBD.				
NOTE 4:	For UE supporting the IVINO only with single-stream restriction the additional minimum requirements				
		Supporting MIMO for H		romonte for US SC	The IDD.
		ad in Tables TRD			Si Type S delection ale
	Gereiiiiii				

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

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

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

Catego	ory 29	H-Set 10B, H-Set 6B, H-Set 8B, H- Set 3B	H-Set 3B	N/A	N/B	
Catego	ory 30	H-Set-10B, H-Set 6B, H-Set 8B, H- Set 3B	H-Set 3B	N/A	H-Set 11B, H-Set 9B	
Catego	ory 31	H-Set 10C, H-Set 8C, H-Set 6C, H- Set 3C	H-Set 3C	N/A	N/A	
Catego	ory 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 li dB are s	ink enhanced performates the set according to H-Set	ance requirements 10B.	type 3 for categorie	es 29, 30 with $\hat{I}_{or} / I_{oc} = 4 \text{ dB}$ and 8	
	Single li dB are s	ink enhanced performa set according to H-Set	ance requirements 10C.	type 3 for categorie	es 31, 32 with $I_{or}/I_{oc} = 4 \text{ dB}$ and 8	
	Single li 18 dB a	ink enhanced performative reset according to H-	ance requirements Set 8B.	type 3 for categorie	es 29, 30 with $\hat{I}_{or}/I_{oc}$ = 15 dB and	
	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 li $\hat{I} \neq I$	ink enhanced performa	ance requirements	type 3 for categorie	es 29, 30 with $\hat{I}_{or}/I_{oc}$ =10dB and	
	1 or / 1 oc =	5dB are set according	to H-Set 6B.		<b>x</b> ( <b>x</b>	
	Single Ii $\hat{I}_{or} / I_{oc}$	ink enhanced performa	ance requirements	type 3 for categorie	es 31, 32 with $I_{or} / I_{oc} = 10$ dB and	
	- Single li	nk minimum requirem	ents for categories	29, 30 in other con	iditions are according to H-Set 3B	
	type 1 e Single li	nhanced performance ink minimum requirem	requirements. ents for categories	31, 32 in other con	ditions are according to H-Set 3C	
NOTE 2:	Open lo perform	op transmit diversity re ance requirements and	equirements are so d H-Set 3C type 1	et according to H-S enhanced performa	et 3B type 1 enhanced ance requirements.	
NOTE 3:	MIMO re	equirements for catego	ories 30 and 32, w	ith $\hat{I}_{or}/I_{oc}$ = 6 and 1	0 dB are set according to H-Set	
	9B and	H-Set 9C respectively.	MIMO requireme	nts for categories 3	0 and 32, with $\hat{I}_{or}/I_{oc}$ = 18 dB are	
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 H ned in Tables TBD	S-DSCH the requ	irements for HS-SC	CCH Type 3 detection are	
NOTE 6:	For UE for HS-[	supporting the MIMO o DSCH are given in Tab	only with single-str le TBD and for HS	eam restriction the S-SCCH type 3 in Ta	additional minimum requirements able 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 0.2.4: Node B Emulator	Robaviour in room	onco to ACK/NACK/DTY
Table 9.2.4. Noue-D Emulator	benaviour in resp	

HS-DPCCH ACK/NACK	Node-B Emulator Behaviour
Field State	
ACK	ACK: new transmission using 1 <sup>st</sup> 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
Phase reference	-	P-CPICH				
I <sub>oc</sub>	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 a power. HS-SCCH intended for the U	and HS-PDSCH shall be -1 shall only use the iden E.	transmitted tity of the L	d continuou JE under te	sly with co st for thos	nstant e TTI	

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

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

Test	Propagation		Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB
1	DV3	-6	65	309
•	175	-3	N/A	423
2	PB3	-6	23	181
2		-3	138	287
3	\/A30	-6	22	190
5	V7.50	-3	142	295
4	V/A120	-6	13	181
-	VAIZO	-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
- 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

Unit	Test 1	Test 2	Test 3	Test 4	
-	P-CPICH				
dBm/3.84 MHz	-60				
	{6,2,1,5}				
	4				
and HS-PDSCH shall be transmitted continuously with constan			nstant		
-1 shall only use the identity of the UE under test for those TTI			e TTI		
E.	-				
	Unit - dBm/3.84 MHz and HS-PDSCH shall be -1 shall only use the iden E.	Unit     lest 1       -     -       dBm/3.84 MHz     -       and HS-PDSCH shall be transmitted     -       -1 shall only use the identity of the UE.     -	Unit     Test 1     Test 2       -     P-CP       dBm/3.84 MHz     -6       {6,2,       4       and HS-PDSCH shall be transmitted continuou       1 shall only use the identity of the UE under teg       E.	Unit     Test 1     Test 2     Test 3       -     P-CPICH       dBm/3.84 MHz     -60       {6,2,1,5}       4       and HS-PDSCH shall be transmitted continuously with cc       1 shall only use the identity of the UE under test for thos       E.	

Table 9.2.1A.4: Minimum re	auirement 16QAM.	Fixed Reference	Channel (F	FRC)	H-Set 1/2/	3
	<b>q o o</b> ,		•••••••••••••••••••••••••••••••••••••••	,		-

Test	Propagation	I	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *				
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB				
1	DV3	-6	198				
1	FAS	-3	368				
2	DB3	-6	34				
2	r b5	-3	219				
3	\//\30	-6	47				
3	VASU	-3	214				
4	VA120	-6	28				
4		-3	167				
*) NOTE 1: Th NOTE 2: Fo	*) 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						
S	caled (multiplied	by 1.5 and rounding to the	he 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.

- Connect the SS (node B emulator) and fader and AW GN 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		ied)	

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

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
1	DV3	-5.9	65	309		
I	170	-2.9	N/A	423		
2	נסס	-5.9	23	181		
2	F BS	-2.9	138	287		
2	3 VA30	-5.9	22	190		
3		-2.9	142	295		
4	\/\\120	-5.9	13	181		
4	VAIZO	-2.9	140	275		
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1						
(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	d rounding to the nearest in	iteger t-put in kbps, where val	ues of i+1/2 are rounded		
U	ıp to i+1, i integer)					

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

### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)			ied)

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

Test	Propagation	F	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	PA3	-5.9	198			
I	170	-2.9	368			
2	002	-5.9	34			
2	PB3	-2.9	219			
2	VA30	-5.9	47			
3		-2.9	214			
4	V/4120	-5.9	28			
4	VAIZU	-2.9	167			
* NOTES: 1	) The reference	value R is for the Fixed R	Reference Channel (FRC) H-Set 1			
2	) For Fixed Refe	rence 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	3) For Fixed Reference Channel (FRC) H-Set 3 the reference values for R should					
b	e scaled (multipl	rea by 3 and rounding to	the nearest integer t-put in Kops, where			
V	aiues 011+1/2 afe	e rounded up to i+1,1 inte	eger)			

# 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-C	PICH	
I <sub>oc</sub>	dBm/3.84 MHz		-(	60	
coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission				4	
NOTE The HS-SCCH-1 and HS-PDS	CH shall be transmitted	continuously wi	th constant po	wer HS-SCC	H-1 shall

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 rec	uirement QPSK, Fix	xed Reference C	hannel (FRC)	H-Set 4
			· · · · · · · · · · · · · · · · · · ·	

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH $E_c/I_{or}$ (dB)	T-put $R$ (kbps) * $\hat{I}_{or}/I_{oc}$ = 0 dB	<b>T-put</b> $R$ (kbps)* $\hat{I}_{or}/I_{oc}$ = 10 dB		
1	DV3	-6	72	340		
I FAS	-3	N/A	439			
2	2 002	-6	24	186		
Z FB5	-3	142	299			
3	2 \//20	-6	19	183		
3 VA30	-3	148	306			
4	4 \///120	-6	11	170		
4 VA120	-3	144	284			
* NOTE: 7	TE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4					

Test	Propagation	Reference value			
Number Conditions		HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}/I_{oc}$ = 10 dB	
1	DV3	-6	98	464	
I FAS	-3	N/A	635		
2	2 092	-6	35	272	
2 FB3	-3	207	431		
2	1/420	-6	33	285	
3 VA30	-3	213	443		
4	4 \\/4120	-6	20	272	
4 VA120	-3	210	413		
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5					

### Table 9.2.1B.3: Minimum requirement QPSK, 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.

- Connect the SS (node B emulator) and fader and AW GN 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 0.153 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-CP	ICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		∋d)	

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

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB	
1	DV3	-5.9	72	340	
1	175	-2.9	N/A	439	
2	0 000	-5.9	24	186	
2 PB3	-2.9	142	299		
3	V/430	-5.9	19	183	
5	VASU	-2.9	148	306	
4	4	-5.9	11	170	
4	VAIZU	-2.9	144	284	
* NOTE: 7	The reference valu	e R is for the Fixed Refere	ence Channel (FRC) H-Set 4	÷	

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

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
1	PΔ3	-5.9	98	464		
I	170	-2.9	N/A	635		
2	PB3	-5.9	35	272		
2	1 00	-2.9	207	431		
з	VA30	-5.9	33	285		
5	1100	-2.9	213	443		
4	VA120	-5.9	20	272		
-	V/1120	-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
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Parameter	Unit	Test 1		
Phase reference		P-CPICH		
I <sub>oc</sub>	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 power. HS-SCC intended for the	1-1 and HS-PDSCH shall be transmitted continuously with constant XCH-1 shall only use the identity of the UE under test for those TTI ine UE.			

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

Test	Propagation	F	Reference value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB
1	DV3	-6	1407
1	FAS	-3	2090

Parameter	Unit	Test 1		
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60		
Redundancy and constellation version coding		{6,2,1,5}		
sequence				
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.				

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

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

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### 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 <sub>oc</sub>	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 constan power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				h constant hose TTI

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

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
2	PB3	-6	23	181		
2	T D5	-3	138	287		
3	1/430	-6	22	190		
5	VASU	-3	142	295		
4	\///120	-6	13	181		
4	VAIZO	-3	140	275		
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed Reference						
t C	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: 1	<b>Test Parameters for</b>	Te sting 1	16QAM FRCs	H-Set 3

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference	-	P-CPICH		
I <sub>oc</sub>	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 constar power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				h constant hose TTI

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
2	DB3	-6	34			
2	FDS	-3	219			
2	VA30	-6	47			
5		-3	214			
4	VA120	-6	28			
4		-3	167			
* NOTES: 1	* 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						
S	scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where					
Vá	alues of i+1/2 are	e rounded up to i+1, i inte	eger)			

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

# 9.2.1C.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 no ise 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 <sub>oc</sub>	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	Propagation Conditions	Reference value		
Number		HS-PDSCH	T-put $R$ (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
1	PA3	-5.9	1407	
1		-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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no	test toleranœ a	ipplied)

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 0.6 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
2	PB3	-5.9	23	181	
2	F B3	-2.9	138	287	
2	V/A20	-5.9	22	190	
3	VASU	-2.9	142	295	
4	\/\\120	-5.9	13	181	
4	VAIZO	-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.14: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

### 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 <sub>oc</sub>	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	Propagation	I	Reference value
Number	Conditions	HS-PDS CH $E_c/I_{or}$ (dB)	T-put $R$ (kbps) * $\hat{I}_{or}/I_{oc}$ = 10.6 dB
2	DP2	-5.9	34
2 PB3	ГБЭ	-2.9	219
2	V/420	-5.9	47
3 VA30	-2.9	214	
4	V/4120	-5.9	28
4	VAIZU	-2.9	167
* NOTES: 1	)The reference v	alue R is for the Fixed R	eference Channel (FRC) H-Set 1, for
F S V	ixed Reference ( caled (multiplied alues of i+1/2 ar	Channel (FRC) H-Set 3 t by 3 and rounding to the e rounded up to i+1, i inte	he reference values for R should be e nearest integer t-put in kbps, where eger)

# 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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		1			
HARQ transmission		4			
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant					
ower. HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for				ded 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	Propagation		Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
		-12	N/A	247			
1	PA3	-9	N/A	379			
•	170	-6	195	N/A			
		-3	329	N/A			
		-9	N/A	195			
2	PB3	-6	156	316			
		-3	263	N/A			
		-9	N/A	212			
3	VA30	-6	171	329			
		-3	273	N/A			
		-9	N/A	191			
4	VA120	-6	168	293			
		-3	263	N/A			
* NOTES: 1	) The reference v 2) For Fixed Refere	alue R is for the Fixed Refe ence Channel (FRC) H-Set	rence Channel (FRC) H-Set 1 2 the reference values for R s	hould 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							
( L	, multiplied by 3 and ip to i+1, i integer)	d rounding to the nearest ir	nteger t-put in kbps, where valu	ies of i+1/2 are rounded			

Parameter	Unit	Test 1	Test 2	Test 3	Test 4				
Phase reference	-	P-CPICH				P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60							
Redundancy and									
constellation version		{6,2,1,5}							
coding sequence									
Maximum number of		4							
HARQ transmission		4							
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant									
power. HS-SCCH-1 shall on	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 requireme	nt type 1 16QAM,
Fixed Reference Channel (FRC) H-Set 1/2/3	3

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	ΡΔ3	-9	312			
•	170	-6	487			
2	PB3	-6	275			
2	1 00	-3	408			
3	٧/۵٦٥	-6	296			
5	V7.50	-3	430			
4	V/A120	-6	271			
-	VAIZO	-3	392			
* NOTES: 1	)The reference v	alue R is for the Fixed R	eference Channel (FRC) H-Set 1			
2	) For Fixed Refe	rence Channel (FRC) H-	Set 2 the reference values for R should			
b	e scaled (multipli	ied by 1.5 and rounding t	o 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						
V	alues of i+1/2 are	e rounded up to i+1, i inte	eger)			

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 paylo ad 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

Test	Propagation		Reference value				
Number	Conditions	HS-PDSCH	<b>T-put</b> $R$ (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.6 dB			
		-11.9	N/A	247			
1	DV3	-8.9	N/A	379			
1	175	-5.9	195	N/A			
		-2.9	329	N/A			
		-8.9	N/A	195			
2	PB3	-5.9	156	316			
		-2.9	263	N/A			
		-8.9	N/A	212			
3	VA30	-5.9	171	329			
	-2.9	273	N/A				
		-8.9	N/A	191			
4	VA120	-5.9	168	293			
		-2.9	263	N/A			
* NOTES: 1	) The reference va	alue R is for the Fixed Refe	rence Channel (FRC) H-Set 1				
2	<ol><li>For Fixed Reference</li></ol>	ence Channel (FRC) H-Set	2 the reference values for R s	hould 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	d rounding to the nearest ir	nteger t-put in kbps, where valu	les of i+1/2 are rounded			
ι	ıp to i+1, i integer)						

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

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Table 9.2.1D.7: Test Parameters for Testing 16QAM FRCs H-	Set 1/H-Set 2/H-Set 3
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			blied)

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

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
1	DA2	-8.9	312	
1	F AS	-5.9	487	
2	DB3	-5.9	275	
2	T D5	-2.9	408	
3	\//\30	-5.9	296	
5	VASU	-2.9	430	
4	\///120	-5.9	271	
4	VAIZO	-2.9	392	
<ul> <li>* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1</li> <li>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,</li> </ul>				
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)				

#### Single Link Performance - Enhanced Performance Requirements 9.2.1E 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 9.2.1E1, 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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 powe HS-SCCH-1 shall only use the identity of the UE under test for those TTI intended for th UE.		

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

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

Test	Propagation	Reference value	
Number	Conditions	HS-PDSCH	<b>T-put</b> <i>R</i> (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and constellation version		16 2 1 5	
coding sequence		{0,2,1,3}	
Maximum number of HARQ		Δ	
transmission		· · · ·	
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	Propagation Conditions	Reference value	
Number		HS-PDSCH $E_c/I_{or}$ (dB)	T-put $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 10 dB
1	PA3	-9	912
1		-6	1730

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60		
Redundancy and constellation version coding sequence		{0,2,5,6}		
Maximum number of HARQ transmission	nber of 4 nission			
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.				

Test	Propagation	Reference value			
Number Conditions		HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0  \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
		-9	N/A	195	
2	PB3	-6	156	316	
		-3	263	N/A	
		-9	N/A	212	
3	VA30	-6	171	329	
		-3	273	N/A	
		-9	N/A	191	
4	VA120	-6	168	293	
		-3	263	N/A	
NOTES:	1) The reference val	ue R is for the Fixed Ref	erence 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					
1	ine nearest integer t	-put in kops, where value	s or i+i/2 are rounded up to i	+ i , i iiilegei)	

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

Parameter	Unit	Test 2	Test 3	Test 4
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60		
Redundancy and				
constellation version		{6,2,1,5}		
coding sequence				
Maximum number of		1		
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			tended for	
the UE.				

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

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
2	PB3	-6	275	
2	1 05	-3	408	
3	VA30	-6	296	
5		-3	430	
4	V/A120	-6	271	
7	VAIZO	-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 <sub>oc</sub>	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	Reference value		
		Conditions	HS-PDSCH	T-put $R$ (kbps) *	
			$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
	1	PA3	-11.9	672	
	I		-8.9	1305	

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)

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

Test	Propagation Conditions	Reference value		
Number		HS-PDSCH	T-put $R$ (kbps)*	
		$E_c / I_{or}$ (dB)	$I_{or} / I_{oc} = 10.6 \text{ dB}$	
1	DA3	-8.9	912	
•	170	-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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		

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

Test	Propagation		Reference value			
Number Conditions		HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
		-8.9	N/A	195		
2	PB3	-5.9	156	316		
		-2.9	263	N/A		
		-8.9	N/A	212		
3	VA30	-5.9	171	329		
		-2.9	273	N/A		
		-8.9	N/A	191		
4	VA120	-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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no t	est tolerance a	pplied)

Test	Propagation	F	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *					
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB					
2	PB3	-5.9	275					
2	1 05	-2.9	408					
3	VA30	-5.9	296					
5		-2.9	430					
4	VA120	-5.9	271					
4		-2.9	392					
* NOTES: 1	* 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								
S	scaled (multiplied by 3 and rounding to the nearest integer t-put in kbps, where							
V	values of i+1/2 are rounded up to i+1, i integer)							

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

# 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		Δ			
HARQ transmission		<b>T</b>			
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.1: Test Parameters for Testing QPSK FRCs H-Set 6

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH $E_c/I_{or}$ (dB)	T-put $R$ (kbps) * $\hat{I}_{or}/I_{oc}$ = 10 dB	
1	DA2	-6	1494	
	FAS	-3	2153	
2	PB3	-6	1038	
		-3	1744	
2	VA30	-6	1142	
3		-3	1782	
4	\///120	-6	909	
4	VA120	-3	1467	

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

# 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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{6,2,1,5}			
Maximum number of HARQ transmission			2	1	
NOTE: The HS-SCCH-1 and HS	-PDSCH shall be transm	nitted continuo	usly with con	stant 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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	PA3	-6	991	
1		-3	1808	
2	PB3	-6	465	
Z FD3	1 05	-3	1370	
З	\//20	-6	587	
5 7-50	-3	1488		
4	\/4120	-6	386	
+	VATZU	-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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		4			
HARQ transmission			4		
NOTE: The HS-SCCH-1	and HS-PDSCH shall be	transmitte	d continuou	usly with co	onstant
power. HS-SCC	H-1 shall only use the iden	tity of the l	JE under te	est for thos	e TTI
intended for the	JE.				

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}/I_{oc}$ = 10 dB	
1	PA3	-6	65	N/A	
	1710	-3	N/A	N/A	
2	DB3	-6	23	N/A	
2	1 05	-3	138	N/A	
3	V/A30	-6	22	N/A	
5	VA30	-3	142	N/A	
4	\///120	-6	13	N/A	
4	VAIZU	-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 $\hat{I}_{ar}/I_{cr}$ = 10 dB this is					
te	ested using the Fi	xed Referenœ Channel (Fl	RC) H-Set 6.		

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

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-CI	PICH	
I <sub>oc</sub>	dBm/3.84 MHz		-60 (no test tole	erance applied	)

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

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	DV3	-5.9	1494		
	F AS	-2.9	2153		
2	200	-5.9	1038		
2 PB3	FDS	-2.9	1744		
2	1/420	-5.9	1142		
3 VA30	VASU	-2.9	1782		
4	\///120	-5.9	909		
4	VAIZU	-2.9	1467		

Table 5.2. IF. 5. Test Falameters for Testing TogAW FRUS II-Set	Table 9.2.1F.9:	<b>Test Parameters for</b>	Testing	16Q AM	FRCs	H-Set 6
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-CPIC	H	
I <sub>oc</sub>	dBm/3.84 MHz		-60 (no test tolera	nœ applied)	

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

Test	Propagation		Reference value
Number	Conditions	HS-PDSCH	<b>T-put</b> $R$ (kbps) *
		$E_c / I_{or}$ (dB)	$I_{or} / I_{oc} = 10.6 \text{ dB}$
1	1 PA3	-5.9	991
I		-2.9	1808
2	DB3	-5.9	465
Z FB3	1 00	-2.9	1370
3	1/420	-5.9	587
5	V7.50	-2.9	1488
4	V/A120	-5.9	386
	VA120	-2.9	1291

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-CF	PICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	(no test tole	eranœ appl	ied)

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

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

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB			
1	D\2	-5.9	65	N/A			
1	FAS	-2.9	N/A	N/A			
2	002	-5.9	23	N/A			
2	2 PB3	-2.9	138	N/A			
	3 VA30	-5.9	22	N/A			
3		-2.9	142	N/A			
4		-5.9	13	N/A			
4	VATZU	-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 $\hat{I}_{ac}/I_{ac}$ = 10 dB this is							
t	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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			•
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		4			
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.1: Test Parameters for Testing QPSK FRCs H-Set 6A

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

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	DA2	-6	1494		
1	F AS	-3	2153		
2	PB3	-6	1038		
2		-3	1744		
3	\//\30	-6	1142		
5	V7.50	-3	1782		
1	\///120	-6	909		
-	VAIZO	-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					
S	hould bescaled	(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-C	PICH	
I <sub>oc</sub>	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 Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)*		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	PA3	-6	991		
		-3	1808		
2	DP2	-6	465		
	F D3	-3	1370		
3 VA	1/420	-6	587		
	VA30	-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)					
Parameter	Unit	Test 1	Test 2	Test 3	Test 4
---	--	-----------	--------	--------	--------
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of			1		
HARQ transmission		4			
NOTE: The HS-SCCH-1	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					se TTI
intended for the L	JE.				

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

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

Test	Propagation		Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps)*	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}/I_{oc}$ = 10 dB			
1	PA3	-6	65	N/A			
•	1710	-3	N/A	N/A			
2	PB3	-6	23	N/A			
2		-3	138	N/A			
З	3 VA30	-6	22	N/A			
5		-3	142	N/A			
1	\/A120	-6	13	N/A			
-	VAIZO	-3	140	N/A			
*NOTE 1: 1	*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	s for R should be scaled (multi	plied by 6.0)			
*NOTE 2: F	*NOTE 2: For UE supporting enhanced performance requirement type 2 and condition $\hat{I}_{or}/I_{oc}$ = 10 dB this is						
te	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.

- 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

- 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, VA 30, VA 120) vary.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
Phase reference		P-CPICH				
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)				

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

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *				
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB				
1	PA3	-5.9	1494				
	175	-2.9	2153				
2	2 PB3	-5.9	1038				
2		-2.9	1744				
3	1/420	-5.9	1142				
	VASU	-2.9	1782				
4	\///120	-5.9	909				
-	VAIZO	-2.9	1467				
*NOTE 1: T	he reference val	ue R is for the Fixed Ref	erence Channel (FRC) H-Set 6				
*NOTE 2: F b v	*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.						

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
Phase reference		P-CPICH				
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)				

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

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

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB				
1	DV3	-5.9	991				
1	175	-2.9	1808				
2	DB3	-5.9	465				
2	r b5	-2.9	1370				
3	2 \//20	-5.9	587				
5	V7.50	-2.9	1488				
1	\///120	-5.9	386				
7	VAIZU	-2.9	1291				
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6						
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R should						
b	be scaled (multiplied by 2.0). The throughput on each cell should be Reference						
v	alue 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

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

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.6 dB			
1	PA3	-5.9	65	N/A			
•	170	-2.9	N/A	N/A			
2	DD2	-5.9	23	N/A			
2	FD3	-2.9	138	N/A			
2	3 VA30	-5.9	22	N/A			
3		-2.9	142	N/A			
Δ	\/4120	-5.9	13	N/A			
4	VAI20	-2.9	140	N/A			
*NOTE 1: 1 ( t	The reference valu Channel (FRC) H- hroughput on ead	ie R is for the Fixed Refere Set 3A the reference value h cell should be Reference	nce Channel (FRC) H-Set 1, F s for R should be scaled (multi value R times 3.	or Fixed Reference plied by 6.0). The			
*NOTE 2: F	For UE supporting	enhanced performance re	quirement type 2 and conditior	$\hat{I}_{or}/I_{oc}$ = 10 dB this is			
t	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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
Phase reference		P-CPICH				
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 6A

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

Test	Propagation	on Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	DV3	-6	1494		
1	F AS	-3	2153		
2	2 PB3	-6	1038		
2		-3	1744		
2	1/420	-6	1142		
5	VASU	-3	1782		
4	\///120	-6	909		
4 VA120		-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					
b	e scaled (multipl	ied by 2.0)			

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Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	/Hz -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.3: Test Parameters for Testing 16QAM FRCs H-Set 6A

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

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	DV3	-6	991			
•	F AS	-3	1808			
2	PB3	-6	465			
2		-3	1370			
2	1/420	-6	587			
3	VASU	-3	1488			
4	VA120	-6	386			
4		-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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		4			
HARQ transmission					
NOTE: The HS-SCCH-1	and HS-PDSCH shall be transmitted continuously with constant			onstant	
power. HS-SCCH	-1 shall only use the iden	tity of the l	JE under te	est for thos	se TTI
intended for the U	IE.				

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps)*	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}/I_{oc}$ = 10 dB	
1	PA3	-6	65	N/A	
1	1710	-3	N/A	N/A	
2	PB3	-6	23	N/A	
2	1 00	-3	138	N/A	
3	V/A30	-6	22	N/A	
5	VA30	-3	142	N/A	
Λ	\///120	-6	13	N/A	
4	VAIZU	-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.					

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

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.

- 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

- 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, VA 30, 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-CF	PICH	
I <sub>oc</sub>	dBm/3.84 MHz		-60 (no test tole	erance applied	)

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

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	DA2	-5.9	1494			
1	FAS	-2.9	2153			
2	PB3	-5.9	1038			
2		-2.9	1744			
2	VA30	-5.9	1142			
3		-2.9	1782			
4	1/4120	-5.9	909			
4	VAIZU	-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						
N 1	<i>v</i> alue 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)			

Test	Propagation	Propagation Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
1	DV3	-5.9	991		
1	FAS	-2.9	1808		
2	PB3	-5.9	465		
2		-2.9	1370		
2	1/420	-5.9	587		
5	VASU	-2.9	1488		
4	1/4120	-5.9	386		
4	VAIZU	-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.10: Test requirement enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 6A

#### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)			ied)

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

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps)*	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	PA3	-5.9	65	N/A		
1	170	-2.9	N/A	N/A		
2	200	-5.9	23	N/A		
2	PD3	-2.9	138	N/A		
		-5.9	22	N/A		
3	VA30	-2.9	142	N/A		
4	V/4120	-5.9	13	N/A		
4	VAIZO	-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						
te	ested using the Fi	xed Reference Channel (Fl	RC) 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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		Λ			
HARQ transmission	4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH-1					
shall only use t	ne identity of the UE under tes	t for those TI	I intended for th	ne UE.	

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

Test	Propagation	on Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	DV3	-6	1494			
1	F AS	-3	2153			
2	DB3	-6	1038			
2	FDS	-3	1744			
2	1/420	-6	1142			
5	VASU	-3	1782			
4	\/4120	-6	909			
-	VAIZO	-3	1467			
*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6						
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should					
b	e scaled (multipl	ied by 3.0)				

Table 9.2.1FC.3: Test Parameters for	Testing 16QAM FRCs H-Set 6B
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence			{6,2	,1,5}	
Maximum number of HARQ transmission				4	
DTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-SCCH shall only use the identity of the UE under test for those TTI intended for the UE.					.HS-SCCH-1

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

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB		
1	DV3	-6	991		
I	175	-3	1808		
2	2 PB3	-6	465		
2		-3	1370		
2	1/420	-6	587		
5	VASU	-3	1488		
4	1/4120	-6	386		
4	VAIZU	-3	1291		
*NOTE 1: T *NOTE 2: F	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)				

able 9.2.1FC.5: Test Parameters الم	for Testing	QPSK FRCs I	H-Set 3B
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	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 cons power. HS-SCCH-1 shall only use the identity of the UE under test for those T intended for the UE.					onstant se TTI

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

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	PA3	-6	65	N/A		
1	170	-3	N/A	N/A		
2	DB3	-6	23	N/A		
2	2 FD3	-3	138	N/A		
2	1/420	-6	22	N/A		
5	3 VA30	-3	142	N/A		
4	\///120	-6	13	N/A		
4	VAIZU	-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

- 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, VA 30, VA 120) vary.

Parameter	Unit	Test 1 Test 2 Test 3		Test 4	
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)			)

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

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *				
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB				
1	DV3	-5.9	1494				
I	FAS	-2.9	2153				
2	DB3	-5.9	1038				
2	FDJ	-2.9	1744				
2	1/420	-5.9	1142				
3	VA30	-2.9	1782				
4	1/44.00	-5.9	909				
4	VAIZU	-2.9	1467				
*NOTE 1: 1	he reference val	ue R is for the Fixed Ref	erence Channel (FRC) H-Set 6				
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 6B the reference values for R should						
k V	be scaled (multiplied by 3.0). The throughput on each cell should be Reference value R.						

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

#### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

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

Test	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	PA3	-5.9	991		
•	175	-2.9	1808		
2	PB3	-5.9	465		
2		-2.9	1370		
3	\//\30	-5.9	587		
5	VA30	-2.9	1488		
4	\///120	-5.9	386		
4	VAIZO	-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					
b v	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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		ied)	

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
1	DV3	-5.9	65	N/A	
I		-2.9	N/A	N/A	
0	002	-5.9	23	N/A	
2	2 PB3	-2.9	138	N/A	
2	3 VA30	-5.9	22	N/A	
3		-2.9	142	N/A	
Л	\/4120	-5.9	13	N/A	
4	VAIZO	-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.					

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

# 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub> 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.					HS-SCCH-1

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

Test	Propagation	opagation Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	DV3	-6	1494			
	PAS	-3	2153			
2	PB3	-6	1038			
2		-3	1744			
2	VA30	-6	1142			
5		-3	1782			
4	1/4120	-6	909			
4	VAIZU	-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						
b	e scaled (multipl	ied by 4.0)				

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

### 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 <sub>oc</sub>	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-	itted continuo	usly with cor	nstant power.	HS-SCCH-1	
shall only use the identity	of the UE under test for	those TTI inte	nded for the	UE.	

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

Test	Propagation		Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)*	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB	
1	PA3	-6	991	
1	170	-3	1808	
2	DB3	-6	465	
2	r D5	-3	1370	
2	\//20	-6	587	
5	VA30	-3	1488	
4	\///120	-6	386	
4 VA120		-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)				

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-CP	ICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		4			
HARQ transmission			4		
NOTE: The HS-SCCH-1	and HS-PDSCH shall be	transmittee	d continuou	isly with co	onstant
power. HS-SCCH	-1 shall only use the iden	tity of the l	JE under te	st for thos	e TTI
intended for the U	IE.				

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

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

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	PA3	-6	65	N/A	
1	170	-3	N/A	N/A	
2	PB3	-6	23	N/A	
2	2 105	-3	138	N/A	
3	3 VA30	-6	22	N/A	
5		-3	142	N/A	
4	\///120	-6	13	N/A	
4	VAIZO	-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					
te	ested using the Fi	xed Reference Channel (Fl	RC) 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

- 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, VA 30, VA 120) vary.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-C	PICH	
I <sub>oc</sub>	dBm/3.84 MHz		-60 (no test tol	erance applied)	

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

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

Test	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)*		
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	DA2	-5.9	1494		
1	175	-2.9	2153		
2		-5.9	1038		
2	F D S	-2.9	1744		
2	VA30	-5.9	1142		
5		-2.9	1782		
1	\///120	-5.9	909		
4	VAIZO	-2.9	1467		
*NOTE 1: T	*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					
v	alue R.				

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

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

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

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
1	DA3	-5.9	991	
1	175	-2.9	1808	
2	200	-5.9	465	
2	T D5	-2.9	1370	
3	1/420	-5.9	587	
5	V7.50	-2.9	1488	
4	\///120	-5.9	386	
4	VAIZO	-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				
V	alue 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-CI	PICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	(no test tole	erance appli	ied)

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

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)*	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB	
1	PA3	-5.9	65	N/A	
•	170	-2.9	N/A	N/A	
2	DD2	-5.9	23	N/A	
2	PB3	-2.9	138	N/A	
2	3 VA30	-5.9	22	N/A	
5		-2.9	142	N/A	
4		-5.9	13	N/A	
4	VAIZO	-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.

Fable 9.2.1G.1: Test	<b>Parameters for</b>	Te sting	<b>QPSK FRCs</b>	H-Set 6
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference				P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz			-60		
Redundancy and						
constellation version		{0,2,5,6}				
coding sequence						
Maximum number of				1		
HARQ transmission		4				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant					tant	
power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI					TI	
intended for th	ne 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 10 dB		
1	DA2	-9	1554		
1	175	-6	2495		
2	002	-9	1190		
2	T D5	-6	2098		
3	\//30	-9	1229		
5	VASU	-6	2013		
4	\///120	-9	1060		
4	VAIZU	-6	1674		

Table 9.2.1	IG.3:	Minimum requ Fixe	irement Enhanced rec d Reference Channel (	quirement type 3 QPSK at $\ \hat{I}_{or}/I_{oc}$ = 5 dB, (FRC) H-Set 6
Test Propagation Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
			F/I (dB)	$\hat{I}$ /I = 5 dB

		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 5 dB
5	5 PB3	-6	1248
5	1 00	-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 <sub>oc</sub>	dBm/3.84 MHz	-60				
Redundancy and						
constellation version		{6,2,1,5}				
coding sequence						
Maximum number of				1		
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 unde	er test for th	ose TTI inte	ended for th	e 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	Propagation	F	Reference value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB
1	DA2	-6	1979
1	F AS	-3	3032
2	002	-6	1619
2	2 PB3	-3	2464
2	3 VA30	-6	1710
5		-3	2490
4	V/A120	-6	1437
	VAIZU	-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	Propagation	F	Reference value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 5 dB
5	5 PB3	-6	779
5 FD	1 05	-3	1688

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		4			
HARQ transmission				r	
NOTE: The HS-SCCH-	1 and HS-PDSCH sha	all be transr	mitted conti	nuously with	n constant
power. HS-SCCH-1 shall only use the identity of the UE under test for the			nose TTI		
intended for the	UE.				

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

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

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}/I_{oc}$ = 10 dB		
		-12	N/A	N/A		
1		-9	N/A	N/A		
	FAS	-6	195	N/A		
		-3	329	N/A		
		-9	N/A	N/A		
2	PB3	-6	156	N/A		
		-3	263	N/A		
	-9		N/A	N/A		
3	VA30	-6	171	N/A		
		-3	273	N/A		
		-9	N/A	N/A		
4	VA120	-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 AW GN 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 De finition 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.

Fable 9.2.1G.9: To	est Parameters fo	or Testing QPSK	FRCs H-Set 6
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ 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	Propagation	Refere	nce value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10.6 dB
1	DV3	-8.9	1554
•	I FAS	-5.9	2495
2	PB3	-8.9	1190
2		-5.9	2098
2	1/420	-8.9	1229
3	VA30	-5.9	2013
4	\///120	-8.9	1060
4	VAIZO	-5.9	1674

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH $E_c / I_{or}$ (dB)	<b>T-put</b> $R$ (kbps) * $\hat{I}_{or} / I_{oc}$ = 5.6 dB		
5	DB3	-5.9	1248		
5	105	-2.9	2044		

# 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

### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ 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	Propagation	R	Reference value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB
1	DA2	-5.9	1979
1	FAS	-2.9	3032
2	PB3	-5.9	1619
2		-2.9	2464
2	1/420	-5.9	1710
3	VA30	-2.9	2490
4	\///120	-5.9	1437
4	VAIZU	-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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB	
5	PB3	-5.9	779	
5	FDS	-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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

Test	Propagation		Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB				
		-11.9	N/A	N/A				
1	DA2	-8.9	N/A	N/A				
1	FAS	-5.9	195	N/A				
		-2.9	329	N/A				
		-8.9	N/A	N/A				
2	PB3	-5.9	156	N/A				
		-2.9	263	N/A				
		-8.9	N/A	N/A				
3	VA30	-5.9	171	N/A				
		-2.9	273	N/A				
		-8.9	N/A	N/A				
4	VA120	-5.9	168	N/A				
		-2.9	263	N/A				
* NOTES: "	* 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 f	or R should be scaled (multip	blied by 3 and rounding to				
t t	the nearest integer	t-put in kbps, where values	s of i+1/2 are rounded up to i-	+1, i integer)				

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

# 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference				P-CPICH		
I <sub>oc</sub>	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					tant	
power. HS-SCCH-1 shall only use the identity of the UE under test for those TTI					TI	
intended for the	ne UE.					

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

# 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB		
1	DV3	-9	1554		
1	175	-6	2495		
2	PB3	-9	1190		
2		-6	2098		
2	VA30	-9	1229		
3		-6	2013		
1	\///120	-9	1060		
4 VA120		-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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 5 \text{ dB}$		
5	PB3	-6	1248		
5	5 FB5	-3	2044		
* NOTES: 1	* 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					
sł	nould be scaled (	multiplied by 2.0)			

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

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH			-	
I <sub>oc</sub>	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	Propagation	F	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	DV3	-6	1979	
1	FAS	-3	3032	
2	PB3	-6	1619	
2		-3	2464	
2	VA30	-6	1710	
3		-3	2490	
4	VA120	-6	1437	
4		-3	2148	
*NOTE 1: T	he reference valu	e R is for the Fixed Refe	erence Channel (FRC) H-Set 6	
NOTE 2: For Fixed Reference Channel (FRC) H-Set 6A the reference values for R				
s	hould 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5 dB		
5	PB3	-6	779		
5	1 05	-3	1688		
*NOTE 1: T	*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					
S	hould bescaled	(multiplied by 2.0)			

Table 9 2 1GA 7. Test	Parameters for To	sting OPSK ERC	s H-Sat 3A
Table 3.2.10A.7. 165		Sung GESKERG	SII-SEL SA

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-CF	PICH	•
I <sub>oc</sub>	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 consta power. HS-SCCH-1 shall only use the identity of the UE under test for those TT intended for the UE.				n constant hose TTI	

Test	Propagation		Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc} = 0 \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
		-12	N/A	N/A			
1	DV3	-9	N/A	N/A			
1	FAS	-6	195	N/A			
		-3	329	N/A			
		-9	N/A	N/A			
2	PB3	-6	156	N/A			
		-3	263	N/A			
		-9	N/A	N/A			
3	VA30	-6	171	N/A			
		-3	273	N/A			
		-9	N/A	N/A			
4	VA120	-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: 1	For UE supporting	enhanced performance re-	quirement type 3 and condition	n $\hat{I}_{or}/I_{oc}$ = 10 dB this is			
1	tested using the Fixed Reference Channel (FRC) H-Set 6A.						

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

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 AW GN 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

- 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ 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	Test Propagation Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	DV3	-8.9	1554		
1	175	-5.9	2495		
2	PB3	-8.9	1190		
2		-5.9	2098		
3	VA30	-8.9	1229		
3		-5.9	2013		
1	\///120	-8.9	1060		
7	VAIZO	-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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB			
5	PB3	-5.9	1248			
5	r b5	-2.9	2044			
*NOTE 1: T	*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 shoul be scaled (multiplied by 2.0). The throughput on each cell should be Reference value R.						

-60 (no test tolerance applied)

 $I_{oc}$ 

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference				P-CPICH		

dBm/3.84 MHz

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

## 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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	DA2	-5.9	1979			
I	FAS	-2.9	3032			
2	002	-5.9	1619			
2	FDJ	-2.9	2464			
2	1/420	-5.9	1710			
5	VASU	-2.9	2490			
4	\/4120	-5.9	1437			
-	VAIZO	-2.9	2148			
*Note1: T	he reference val	ue R is for the Fixed Ref	erence Channel (FRC) H-Set 6			
*NOTE 2: F	For Fixed Referer	ice Channel (FRC) H-Se	t 6A the reference values for R should			
b	be scaled (multiplied by 2.0). The throughput on each cell should be Reference					
v	alue 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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB			
5	DB2	-5.9	779			
5	r b5	-2.9	1688			
*NOTE 1: T	*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						
Va	alue 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
		-11.9	N/A	N/A		
1	DA2	-8.9	N/A	N/A		
•	FAS	-5.9	195	N/A		
		-2.9	329	N/A		
		-8.9	N/A	N/A		
2	PB3	-5.9	156	N/A		
		-2.9	263	N/A		
		-8.9	N/A	N/A		
3	VA30	-5.9	171	N/A		
		-2.9	273	N/A		
		-8.9	N/A	N/A		
4	VA120	-5.9	168	N/A		
		-2.9	263	N/A		
*NOTE 1: 1	The reference valu	e R is for the Fixed Refere	nce 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 $\hat{I}_{ar}/I_{ar}$ = 10 dB this is						
t	ested using the Fi	xed Reference Channel (Fl	RC) H-Set 6A.			

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

# 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I <sub>oc</sub>	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					tant	
power. HS-S0	e the identi	ty of the UE	under test	for those T	TI	
intended for the	ne UE.					

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

# 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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB			
1	DV3	-9	1554			
1	175	-6	2495			
2	DB3	-9	1190			
2	FDS	-6	2098			
2	1/420	-9	1229			
5	VASU	-6	2013			
4	1/4120	-9	1060			
4	VAIZO	-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 (i	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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5 dB			
5	PB3	-6	1248			
5	1 00	-3	2044			
* NOTE 1: T	* 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						
b	e scaled (multipl	ied by 2.0)				

Table 9.2.1GB.4: Test Parameters for Testi	ing 16QAM FRCs H-Set 6A
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I <sub>oc</sub>	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.					wer. HS- e 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	Propagation	F	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB	
1	DV3	-6	1979	
1	FAS	-3	3032	
2	PB3	-6	1619	
2		-3	2464	
2	3 VA30	-6	1710	
3		-3	2490	
4	1/4100	-6	1437	
4	VAIZU	-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				
S	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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 5 \text{ dB}$		
5	PB3	-6	779		
5		-3	1688		
*NOTE 1: T	*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					
b	e scaled (multipli	ied by 2.0)			

Table 9 2 1GB 7. Tes	t Parameters for Tes	ting QPSK FRCs	H-Set 3A
Table 5.2.100.7. 163		ang ei on i nos	II-Set SA

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference			P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission			2	ļ	
NOTE: The HS-SCCH power. HS-SCC intended for the	1 and HS-PDSCH sh CH-1 shall only use the UE.	all be transr e identity of	nitted conti the UE unc	nuously with ler test for tl	n constant hose TTI

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0  \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
		-12	N/A	N/A		
1	DV3	-9	N/A	N/A		
1	FAS	-6	195	N/A		
		-3	329	N/A		
		-9	N/A	N/A		
2	PB3	-6	156	N/A		
		-3	263	N/A		
		-9	N/A	N/A		
3	3 VA30	-6	171	N/A		
		-3	273	N/A		
		-9	N/A	N/A		
4	VA120	-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: 1	*NOTE 3: For UE supporting enhanced performance requirement type 3 and condition $\hat{I}_m/I_m$ = 10 dB this is					
t	tested using the Fixed Reference Channel (FRC) H-Set 6A.					

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

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 AW GN 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

- 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 loc 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, VA 30, VA 120) 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 <sub>oc</sub>	dBm/3.84 MHz		-60 (no te	st toleranœ	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 10.6 dB	
1	DV3	-8.9	1554	
1	FAS	-5.9	2495	
2	2 PB3	-8.9	1190	
2		-5.9	2098	
2	1/420	-8.9	1229	
5	VA30	-5.9	2013	
1	\///120	-8.9	1060	
4	VAIZO	-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	$\hat{I}_{or} / I_{oc} = 5 \text{ dB},$
Fixed Reference Channel (FRC) H-Set 6A	

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_{_{c}}/I_{_{or}}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 5.6 dB		
Б	DB2	-5.9	1248		
5	FDS	-2.9	2044		
*NOTE 1: T	*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					
b va	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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1		-5.9	1979		
1	FAS	-2.9	3032		
2	DB3	-5.9	1619		
2	PD3	-2.9	2464		
2	1/420	-5.9	1710		
5	VASU	-2.9	2490		
4	\///120	-5.9	1437		
4	VAIZO	-2.9	2148		
*Note1: T	*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					
b v	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	Propagation	n Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB		
5	DB3	-5.9	779		
5		-2.9	1688		
*NOTE 1: T	*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					
V	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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)			

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB		
		-11.9	N/A	N/A		
1	DA2	-8.9	N/A	N/A		
	FAS	-5.9	195	N/A		
		-2.9	329	N/A		
		-8.9	N/A	N/A		
2	PB3	-5.9	156	N/A		
		-2.9	263	N/A		
		-8.9	N/A	N/A		
3	VA30	-5.9	171	N/A		
		-2.9	273	N/A		
		-8.9	N/A	N/A		
4	VA120	-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 $\hat{I}_{ac}/I_{ac}$ = 10 dB this is						
tested using the Fixed Reference Channel (FRC) H-Set 6A.						

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

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

# 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 6B

# 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB		
1	DV3	-9	1554		
1	PAS	-6	2495		
2	PB3	-9	1190		
		-6	2098		
2	3 VA30	-9	1229		
3		-6	2013		
1	1/4120	-9	1060		
4	VAIZU	-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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)*		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 5 \text{ dB}$		
5	PB3	-6	1248		
5	1 00	-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	<sup>r</sup> Testing 16QAM FRCs H-Set 6B
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				•
I <sub>oc</sub>	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.					ower. HS- e UE.	
Table 9.2.1GC.5: Minimum requirement Enhanced requirement type 3 16QAM at $\hat{I}_{or}/I_{oc}$ = 10 dB,						
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Fixed Reference Channel (FRC) H-Set 6B						

Test	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB		
1	DV3	-6	1979		
	FAS	-3	3032		
2	002	-6	1619		
2	FDS	-3	2464		
2	1/420	-6	1710		
3	VASU	-3	2490		
4	1/4100	-6	1437		
4	VAIZU	-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	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5 dB		
5	PB3	-6	779		
5	1 05	-3	1688		
*NOTE 1: T	*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					
b	e scaled (multipl	ied 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-CF	PICH	
I <sub>oc</sub>	dBm/3.84 MHz		-6	60	
Redundancy and constellation version coding sequence		{0,2,5,6}			
Maximum number of HARQ transmission			2	ļ	
NOTE: The HS-SCCH- power. HS-SCC intended for the	1 and HS-PDSCH sh H-1 shall only use the UE.	all be transr e identity of	nitted conti the UE unc	nuously with ler test for t	n constant hose TTI

Test	Propagation	n Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or} / I_{oc}$ = 10 dB		
		-12	N/A	N/A		
1	ΡΔ3	-9	N/A	N/A		
'	175	-6	195	N/A		
		-3	329	N/A		
		-9	N/A	N/A		
2	PB3	-6	156	N/A		
		-3	263	N/A		
		-9	N/A	N/A		
3	VA30	-6	171	N/A		
		-3	273	N/A		
		-9	N/A	N/A		
4	VA120	-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: F	For UE supporting	enhanced performance rec	quirement type 3 and condition	$\hat{I}_{or} / I_{oc}$ = 10 dB this is		
t	tested using the Fixed Reference Channel (FRC) H-Set 6B.					

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

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.

- 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

- 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, VA 30, 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 <sub>oc</sub>	dBm/3.84 MHz		-60 (no te	st toleranœ	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 Propagation Refe			rence value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	DV3	-8.9	1554			
	175	-5.9	2495			
2	DB3	-8.9	1190			
2	FDS	-5.9	2098			
2	VA30	-8.9	1229			
3		-5.9	2013			
4	\///120	-8.9	1060			
4	VAIZO	-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	Propagation	F	Reference value			
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB			
5	PB3	-5.9	1248			
5		-2.9	2044			
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6.					
*NOTE 2: F b v	*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.					

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

#### 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB		
1	DV3	-5.9	1979		
1	FAS	-2.9	3032		
2	PB3	-5.9	1619		
2		-2.9	2464		
2	VA30	-5.9	1710		
3		-2.9	2490		
1	\/4120	-5.9	1437		
-	VAIZO	-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					
v	alue 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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB			
5	DB2	-5.9	779			
5	FDS	-2.9	1688			
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6.					
*NOTE 2: F	*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						
Va	alue 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)				

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.6 dB	$\hat{I}_{or} / I_{oc}$ = 10.6 dB			
		-11.9	N/A	N/A			
1	DA2	-8.9	N/A	N/A			
	FAS	-5.9	195	N/A			
		-2.9	329	N/A			
		-8.9	N/A	N/A			
2	PB3	-5.9	156	N/A			
		-2.9	263	N/A			
		-8.9	N/A	N/A			
3	VA30	-5.9	171	N/A			
		-2.9	273	N/A			
		-8.9	N/A	N/A			
4	VA120	-5.9	168	N/A			
		-2.9	263	N/A			
*NOTE 1: 7	The reference valu	ue R is for the Fixed Refere	nce Channel (FRC) H-Set 1.				
*NOTE 2: F	For Fixed Referen	ce Channel (FRC) H-Set 3I	B the reference values for R sl	hould be scaled			
(multiplied by 9.0). The throughput on each cell should be Reference value R times 3.							
*NOTE 3: F	For UE supporting	enhanced performance rec	quirement type 3 and conditior	$\hat{I}_{or}/I_{oc} = 10 \text{ dB this is}$			
tested using the Fixed Reference Channel (FRC) H-Set 6B.							

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

## 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5	
Phase reference		P-CPICH					
I <sub>oc</sub>	dBm/3.84 MHz	-60					
Redundancy and constellation version		{0,2,5,6}					
coding sequence       Maximum number of       HARQ transmission							
NOTE: The HS-SCCI power. HS-SC intended for th	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.1: Test Parameters for Testing QPSK FRCs H-Set 6C

# 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	Propagation	Refe	erence value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 10 \text{ dB}$			
1	DV3	-9	1554			
1	175	-6	2495			
2	PB3	-9	1190			
		-6	2098			
2	1/420	-9	1229			
3	VASU	-6	2013			
1	VA120	-9	1060			
4		-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 (i	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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5 dB			
5	PB3	-6	1248			
5	1 05	-3	2044			
* NOTE 1: T	he reference val	ue R is for the Fixed Ref	erence Channel (FRC) H-Set 6.			
* NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should						
b	e scaled (multipl	ied by 4.0).				

Table 9.2.1GD.4: Test Parameters for	<sup>r</sup> Testing 16QAM FRCs H-Set 6C
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Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
I <sub>oc</sub>	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	Propagation	I	Reference value
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10 dB
1	DA2	-6	1979
I	FAS	-3	3032
0	PB3	-6	1619
2		-3	2464
2	VA30	-6	1710
3		-3	2490
4	VA120	-6	1437
4		-3	2148
*NOTE 1: T	he reference valu	e R is for the Fixed Refe	erence Channel (FRC) H-Set 6.
*NOTE 2: F s	or Fixed Referen hould be scaled (	ce Channel (FRC) H-Se multiplied by 4.0).	t 6C the reference values for R

# 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	Propagation	Reference value				
Number Conditions		HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 5 \text{ dB}$			
5	PB3	-6	779			
5	1 05	-3	1688			
*NOTE 1: T	he reference val	ue R is for the Fixed Ref	erence Channel (FRC) H-Set 6.			
*NOTE 2: For Fixed Reference Channel (FRC) H-Set 6C the reference values for R should						
b	e scaled (multipl	ied by 4.0).				

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
Phase reference		P-CPICH				
I <sub>oc</sub>	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 TT intended for the UE.						

Test	Propagation	on Reference value						
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc} = 0 \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB				
		-12	N/A	N/A				
1		-9	N/A	N/A				
'	175	-6	195	N/A				
		-3	329	N/A				
		-9	N/A	N/A				
2 PB3	PB3	-6	156	N/A				
	-3	263	N/A					
		-9	N/A	N/A				
3	VA30	-6	171	N/A				
		-3	273	N/A				
		-9	N/A	N/A				
4	VA120	-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								

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

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.

tested using the Fixed Reference Channel (FRC) H-Set 6C.

#### 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.

- 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, VA 30, 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ 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	Propagation	Refe	rence value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	DV3	-8.9	1554			
1	175	-5.9	2495			
2	DB3	-8.9	1190			
2	1 05	-5.9	2098			
3	\//\30	-8.9	1229			
3	V7.00	-5.9	2013			
1	\///120	-8.9	1060			
7	VAIZO	-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	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	Propagation	Reference value					
Number Conditions		HS-PDSCH	T-put R (kbps)*				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB				
5	PB3	-5.9	1248				
5	T D5	-2.9	2044				
*NOTE 1: T	he reference val	ue R is for the Fixed Refe	erence Channel (FRC) H-Set 6.				
*NOTE 2: F b vi	*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.						

 $I_{oc}$ 

			<b>J</b>			
Parameter	Unit	Test 1	Test 2	Test 3	Test 4	Test 5
Phase reference		P-CPICH				
Ioc	dBm/3.84 MHz	-60 (no test tolerance applied)				

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

#### 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	Propagation	n Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.6 dB			
1	DV3	-5.9	1979			
1	FAS	-2.9	3032			
2	002	-5.9	1619			
2	FD3	-2.9	2464			
2	3 VA30	-5.9	1710			
5		-2.9	2490			
1	\/4120	-5.9	1437			
-	VAIZO	-2.9	2148			
*Note1: T	*Note1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6.					
*NOTE 2: F	For Fixed Referen	ice Channel (FRC) H-Se	t 6C the reference values for R should			
b v	be scaled (multipli value R.	ied by 4.0). The through	put on each cell should be Reference			

#### 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	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *				
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 5.6 dB				
Б	DB2	-5.9	779				
5	F D S	-2.9	1688				
*NOTE 1: T	he reference val	ue R is for the Fixed Refe	erence Channel (FRC) H-Set 6.				
*NOTE 2: F	*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							
Va	alue 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)			

Test	Propagation	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.6 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.6 dB			
		-11.9	N/A	N/A			
1	PA3	-8.9	N/A	N/A			
I	FAS	-5.9	195	N/A			
		-2.9	329	N/A			
		-8.9	N/A	N/A			
2	PB3	-5.9	156	N/A			
		-2.9	263	N/A			
		-8.9	N/A	N/A			
3	VA30	-5.9	171	N/A			
		-2.9	273	N/A			
		-8.9	N/A	N/A			
4	VA120	-5.9	168	N/A			
		-2.9	263	N/A			
*NOTE 1: 7	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 1.						
*NOTE 2: F	*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: F	For UE supporting	enhanced performance re	quirement type 3 and conditio	n $\hat{I}_{or} / I_{oc}$ = 10 dB this is			
t	ested using the Fi	xed Reference Channel (F	RC) H-Set 6C.				

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

## 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.

Parameter	Unit	Test 1		
Phase reference		P-CPICH		
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8

Table 9.2.1H.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8

Test	Propagation	Reference value			
Number	Conditions		T-put R (kbps) HS-PDSCH		
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c/I_{or}$ = -2 dB		
1	DV3	15	4507		
I	175	18	5736		
NOTE: When determining lor/loc, 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.

- 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	
Added or Reconfigured DL TrCH information list	1 TrCHs added	
- Added or Reconfigured DL TrCH information		
- CHOICE DL parameters	HS-DSCH	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
<ul> <li>Added or reconfigured MAC-ehs reordering</li> </ul>		Rel-7
queue		
<ul> <li>MAC-ehs queue to add or reconfigure list</li> </ul>	(one queue)	Rel-7
- MAC-ehs queue ld	0	Rel-7
- T1	50	Rel-7
- Treset	Not Present	Rel-7
- MAC-ehs window size	16	Rel-7
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- HS-SCCH Channelisation Code	3	
- CHOICE mode	FDD	
- Downlink 64QAM configured	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 toleranœ applied)	

Table 9.2.1H.4: Test requirement Enhanced requirement type 2 64QAM,Fixed Reference Channel (FRC) H-Set 8

Test	Propagation	Reference value	
Number	Conditions		T-put R (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB
1	DV3	15.6	4507
	FAS	18.6	5736
* NOTE: When determining lor/loc, 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.

Deremeter	l lait	Toot 4	
Parameter	Unit	lest l	
Phase reference		P-CPICH	
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Table 9.2.1HA.2: Minimum requirement Enhanced	requirement type 2 64QAM,
Fixed Reference Channel (FRC)	H-Set 8A

Test Number	Propagation	Reference value	
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB) *	$E_{c} / I_{or}$ = -2 dB
1	PA3	15	4507
2	18	5736	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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 no ise 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	FDD	
- Downlink 64QAM configured	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

- 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.

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 9.2.1HAA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

## Table 9.2.1HA.4: Test requirement Enhanced requirement type 2 64QAM,Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation	Reference value	
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB
1	DV3	15.6	4507
1		18.6	5736
*NOTE 1: When determining lor/loc, the contribution from $I_{atr}$ 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Table 9.2.1HB.2: Minimum requirement Enhanced	requirement type 2 64QAM,
Fixed Reference Channel (FRC	) H-Set 8A

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB) *	$E_c / I_{or}$ = -2 dB	
1	PA3	15	4507	
	18	5736		
*NOTE 1: When determining lor/loc, 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	FDD	
- Downlink 64QAM configured	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

- 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)	
$I_{otx} / I_{or}$	dB	-24.4 (no test tolerance applied)	

#### Table 9.2.1HBA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

## Table 9.2.1HB.4: Test requirement Enhanced requirement type 2 64QAM,Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB	
1	DV3	15.6	4507	
I FAS	18.6	5736		
*NOTE 1: When determining lor/loc, the contribution from $I_{atr}$ 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8B

Table 9.2.1HC.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c / I_{or}$ = -2 dB	
1	PA3	15	4507	
•	170	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 lor/loc, the contribution from $I_{\it otx}$ 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.

- 1) Connect the SS (node B emulator) and fader and AWGN no ise 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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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

- 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.

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.3: Test Parameters for Testing 64QAM FRCs H-Set 8B

## Table 9.2.1HC.4: Test requirement Enhanced requirement type 2 64QAM,Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB	
1	DV3	15.6	4507	
I	FAS	18.6	5736	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8C

Table 9.2.1HD.2: Minimum requirement Enhanced requirement type 2 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation	Reference value		
	Conditions		T-put R (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -2 dB	
1	PA3	15	4507	
1 1 75	18	5736		
*NOTE 1: When determining lor/loc, the contribution from $I_{otr}$ 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.

- 1) Connect the SS (node B emulator) and fader and AWGN no ise 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	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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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.

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.3: Test Parameters for Testing 64QAM FRCs H-Set 8C

## Table 9.2.1HD.4: Test requirement Enhanced requirement type 2 64QAM,Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c/I_{or}$ = -1.9 dB	
1	DV3	15.6	4507	
1	FAS	18.6	5736	
*NOTE 1: When determining lor/loc, 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				

## 9.2.11 Single Link Performance - Enhanced Performance Requirements Type 3 - 64QAM, Fixed Reference Channel (FRC) H-Set 8

#### 9.2.11.1 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.

#### 9.2.1 I.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 9.2.11.1 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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 9.2.11.1: Test Parameters for Testing 64QAM FRCs H-Set 8

Table 9.2.11.2: Minimum requirement Enhanced requirement type 3 64QAM,Fixed Reference Channel (FRC) H-Set 8

Test	Propagation	Reference value	
Number	Conditions		T-put R (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -2 dB
1	PA3	15	6412
1	175	18	7638
NOTE: When determining lor/loc, 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

9.2.1 I.4.1 Initial conditions

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

- 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 9.2.11.2A 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	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	
Added or Reconfigured DL TrCH information list	1 TrCHs added	
- Added or Reconfigured DL TrCH information		
- CHOICE DL parameters	HS-DSCH	
- CHOICE DL MAC header type	MAC-ehs	Rel-7
<ul> <li>Added or reconfigured MAC-ehs reordering</li> </ul>		Rel-7
queue		
- MAC-ehs queue to add or reconfigure list	(one queue)	Rel-7
- MAC-ehs queue Id	Ò	Rel-7
- T1	50	Rel-7
- Treset	Not Present	Rel-7
- MAC-ehs window size	16	Rel-7
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Information		
- HS-SCCH Channelisation Code	2	
- HS-SCCH Channelisation Code	3	
- CHOICE mode	FDD	
- Downlink 64QAM configured	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 9.2.11.3 and 9.2.11.4 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.

#### 9.2.11.5 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 9.2.11.3: Test Parameters for Testing 64QAM FRCs H-Set 8

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
I <sub>otx</sub> / I <sub>or</sub>	dB	-24.4 (no test toleranœ applied)

## Table 9.2.11.4: Test requirement Enhanced requirement type 3 64QAM,Fixed Reference Channel (FRC) H-Set 8

Test	Propagation	Reference value	
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB
1	DV3	15.6	6412
•	175	18.6	7638
* NOTE: When determining lor/loc, 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

#### 9.2.1 IA.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.

#### 9.2.1 IA.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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

Table 9.2.1IA.2: Minimum requirement Enhanced requirement type 3 64QAM,
Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation	Reference value	
	Conditions		T-put R (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -2 dB
1	PA3	15	6412
1		18	7638
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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.

#### 9.2.1 IA.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.

#### 9.2.1 IA.4 Method of test

#### 9.2.1 IA.4.1 Initial conditions

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

- 1) Connect the SS (node B emulator) and fader and AWGN no ise 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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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

- 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
$I_{otx} / I_{or}$	dB	-24.4 (no test tolerance applied)

#### Table 9.2.1IA.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

 Table 9.2.1IA.4: Test requirement Enhanced requirement type 3 64QAM,

 Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB	
1	DA2	15.6	6412	
1	FAS	18.6	7638	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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

## 9.2.1 IB.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.

#### 9.2.1 IB.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.

Demonster	11-26	Trate	
Parameter	Unit	lest 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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 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.1: Test Parameters for Testing 64QAM FRCs H-Set 8A

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		
			T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -2 dB	
1	PA3	15	6412	
I		18	7638	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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.

#### 9.2.1 IB.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.

#### 9.2.1 IB.4 Method of test

#### 9.2.1 IB.4.1 Initial conditions

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

- 1) Connect the SS (node B emulator) and fader and AWGN no ise 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 9.2.11B.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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
- Downlink information for each radio link		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

#### 9.2.1 IB.4.2 Procedure

- 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.

#### 9.2.1 IB.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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)	
$I_{otx}/I_{or}$	dB	-24.4 (no test toleranœ applied)	

#### Table 9.2.1IB.3: Test Parameters for Testing 64QAM FRCs H-Set 8A

Table 9.2.1IB.4: Test requirement Enhanced requirement type 3 64QAM,Fixed Reference Channel (FRC) H-Set 8A

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -1.9 dB	
1	DV3	15.6	6412	
1	PAS	18.6	7638	
*NOTE 1: When determining lor/loc, the contribution from $I_{atr}$ 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

#### 9.2.1 IC.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 UT RA 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.

#### 9.2.1 IC.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 para meters 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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.	UE.		

Table 9.2.1IC.1: Test Parameters for Testing 64QAM FRCs H-Set 8B

 Table 9.2.1IC.2: Minimum requirement Enhanced requirement type 3 64QAM,

 Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation	Reference value		
	Conditions		T-put R (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -2 dB	
1	ΡΔ3	15	6412	
1	170	18	7638	
*NOTE 1: When determining lor/loc, 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.

#### 9.2.1 IC.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.

#### 9.2.1 IC.4 Method of test

#### 9.2.1 IC.4.1 Initial conditions

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

- 1) Connect the SS (node B emulator) and fader and AW GN 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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
- Downlink information for each radio link		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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.

#### 9.2.1 IC.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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
$I_{otx} / I_{or}$	dB	-24.4 (no test tolerance applied)

#### Table 9.2.1IC.3: Test Parameters for Testing 64QAM FRCs H-Set 8B

# Table 9.2.1IC.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8B

Test Number	Propagation	Reference value	
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -1.9 dB
1	DA2	15.6	6412
I	FAS	18.6	7638
*NOTE 1: When determining lor/loc, the contribution from $I_{atr}$ 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

# 9.2.1 ID.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.

# 9.2.1 ID.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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing 64QAM FRCs H-Set 8C

 Table 9.2.1ID.2: Minimum requirement Enhanced requirement type 3 64QAM,

 Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation	Reference value		
	Conditions		T-put R (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_c / I_{or}$ = -2 dB	
1	ΡΔ3	15	6412	
1	175	18	7638	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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.

# 9.2.1 ID.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.

# 9.2.1 ID.4 Method of test

### 9.2.1 ID.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 no ise 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 9.2.11D.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	FDD	
- Downlink 64QAM configured	TRUE	Rel-7
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- DL channelisation code		
- Code number	7	
Downlink secondary cell info FDD		Rel-8
- CHOICE Configuration info	New configuration	
- Downlink 64QAM configured	TRUE	

# 9.2.1 ID.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.

### 9.2.1 ID.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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)	
I <sub>otx</sub> / I <sub>or</sub>	dB	-24.4 (no test toleranœ applied)	

#### Table 9.2.1ID.3: Test Parameters for Testing 64QAM FRCs H-Set 8C

# Table 9.2.1ID.4: Test requirement Enhanced requirement type 3 64QAM, Fixed Reference Channel (FRC) H-Set 8C

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB) *	$E_{c} / I_{or}$ = -1.9 dB	
1	DA2	15.6	6412	
1	FAS	18.6	7638	
*NOTE 1: When determining lor/loc, the contribution from $I_{atx}$ 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{0,2, 5, 6}
coding sequence		
Maximum number of		1
HARQ transmission		
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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 4 \text{ dB}$
1	VA3	-2	1397

Table 9 2 1 1 3.	Test Parameters f	or Testing	160 AM	FRCs	1-Sot 10
	I COL FAIAIIICICIO I	or resuring	IUQAW	LUC21	I-Set IV

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	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 constant power. H test for those TTI	1 and HS-PDSCH shall be transmitted continuously with . HS-SCCH-1 shall only use the identity of the UE under TI intended for the UE.		

# Table 9.2.1J.4: Minimum requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10

Test	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 8 \ \mathbf{dB}$
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 AW GN 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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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.

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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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Table 9.2.1JA.2: Minimum requirement Enhanced requirement type 2 QP	'SK,
Fixed Reference Channel (FRC) H-Set 10A	

Test	Propagation	tion Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps)*		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 9.2.1.14.3. Test Paramet	ors for Tosting	160 AM FRCs	H-Sot 10A
Table 3.2. IJA.J. Test ratallet	ersion resurig		H-Sel IVA

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{6, 2, 1, 5}
coding sequence		
Maximum number of		1
HARQ transmission		+
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 und		e 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 Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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				
b	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.

- 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

- 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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should		
b	be scaled (multiplied by 2.0). The throughput on each cell should be Reference		
V	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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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: F	NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should			
b	e scaled (multipli	lied by 2.0). The throughput on each cell should be Reference		
V	alue R.			

Table 9.2.1JA.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10A

# 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{0,2, 5, 6}
coding sequence		
Maximum number of		1
HARQ transmission		+
NOTE: The HS-SCCH-	and HS-PDSCH shall be t	ransmitted continuously
with constant po	wer. HS-SCCH-1 shall only	use the identity of the UE
under test for the	ose TTI intended for the UE	

Table 9.2.1JB.1: Test Parameters for Testing QPSK FRCs H-Set 10A

Test Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 4 \text{ dB}$		
1	VA3	-2	1397		
*NOTE 1: T	*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.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Table 9.2.1JB.3: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{6, 2, 1, 5}
coding sequence		
Maximum number of		1
HARQ transmission		+
NOTE: The HS-SCCH-1	and HS-PDSCH shall be tra	nsmitted continuously with
constant power. H	HS-SCCH-1 shall only use th	e 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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)*	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 8 \text{ dB}$	
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.

- Connect the SS (node B emulator) and fader and AW GN 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

- 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied

#### Table 9.2.1JB.5: Test Parameters for Testing QPSK FRCs H-Set 10A

#### Table 9.2.1JB.6: Test requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4.6 dB		
1	VA3	-1.9	1397		
*NOTE 1: T	*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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)

# Table 9.2.1JB.8: Test requirement Enhanced requirement type 2 16QAM,Fixed Reference Channel (FRC) H-Set 10A

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 8.6 dB		
1	VA3	-1.9	1726		
*NOTE 1: T	NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10				
*NOTE 2: F	or Fixed Referen	Fixed Reference Channel (FRC) H-Set 10A the reference values for should			
b v	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.

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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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 10B

Table 9.2.1JC.2: Minimum requirement Enhanced requirement type 2 QPS	к,
Fixed Reference Channel (FRC) H-Set 10B	

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4 dB	
1	VA3	-2	1397	
*NOTE 1: T	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 9.2.1.JC.3: Test	Parameters for	Testing	16QAM FRCs	H-Set 10B
	i ulumeters for	resung	I VQAMI I NOS	II OCLIVE

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		{6, 2, 1, 5}	
coding sequence			
Maximum number of		1	
HARQ transmission		+	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with			
constant power. I	r. 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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 8 dB	
1	VA3	-2	1726	
*NOTE 1: T	*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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4.6 dB
1	VA3	-1.9	1397
*NOTE 1: T	*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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)

Test	Test Propagation Reference valu		Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 8.6 dB	
1	VA3	-1.9	1726	
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10			
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 10B the reference values for should			
b	e scaled (multipli	lied by 3.0). The throughput on each cell should be Reference		
V	alue R.			

#### Table 9.2.1JC.8: Test requirement Enhanced requirement type 2 16QAM, Fixed Reference Channel (FRC) H-Set 10B

# 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 10C

Test Propagation		Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 4 \text{ dB}$
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.2: Minimum requirement Enhanced requirement type 2 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Table 9.2.1JD.3: Test Parameters for Testing 16QAM FRCs H-Set 10C

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{6, 2, 1, 5}
coding sequence		
Maximum number of		1
HARQ transmission		7
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously wi		nsmitted continuously with
constant power. H	HS-SCCH-1 shall only use th	e 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 Propagation		Reference value	
Number	Conditions	HS-PDSCH T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 no ise 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		
<ul> <li>Downlink information for each radio links</li> <li>Downlink DPCH info for each RL</li> </ul>		
- 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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 Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4.6 dB	
1	VA3	-1.9	1397	
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10			
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should			
b	be scaled (multiplied by 4.0). The throughput on each cell should be Reference			
V	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 <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 8.6 dB	
1	VA3	-1.9	1726	
*NOTE 1: T	NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10			
*NOTE 2: F	NOTE 2: For Fixed Reference Channel (FRC) H-Set 10C the reference values for should			
b vi	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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		<i>{</i> 6 <i>,</i> 2 <i>,</i> 1 <i>,</i> 5 <i>}</i>
coding sequence		
Maximum number of		1
HARQ transmission		+
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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 8 \text{ dB}$
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 AW GN 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	
<ul> <li>HS-SCCH Channelisation Code</li> </ul>	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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4.6 dB
1	VA3	-1.9	2621

Γable 9.2.1K.7: Test Parameters for Testir	ng 16QAM FRCs H-Set 10
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Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{0,2, 5, 6}
coding sequence		
Maximum number of		А
HARQ transmission		
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.1: Test Parameters for Testing QPSK FRCs H-Set 10A

# Table 9.2.1KA.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4 dB	
1	VA3	-2	2621	
*NOTE 1: T	*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				
b	be scaled (multiplied by 2.0)			

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		<i>{</i> 6 <i>,</i> 2 <i>,</i> 1 <i>,</i> 5 <i>}</i>
coding sequence		
Maximum number of		1
HARQ transmission		7
NOTE: The HS-SCCH-1	and HS-PDSCH shall be tra	nsmitted continuously with
constant power. I	HS-SCCH-1 shall only use th	e identity of the UE under
test for those TTI	intended for the UE.	

Table 9.2.1KA.3:	Test Parameters for	or Testing 16QAM	FRCs H-Set 10A
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Table 9.2.1KA.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10A

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

- 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps)		
		$E_{c}/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 4.6 dB	
1	VA3	-1.9	2621	
*NOTE 1: T	*NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10			
*NOTE 2: F	*NOTE 2: For Fixed Reference Channel (FRC) H-Set 10A the reference values for should			
b	be scaled (multiplied by 2.0). The throughput on each cell should be Reference			
V	alue R.			

#### Table 9.2.1KA.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Table 9.2.1KA.7: 1	<b>Fest Parameters for</b>	Testing 16QAM	FRCs H-Set 10A
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Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps)		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		{0,2, 5, 6}	
coding sequence			
Maximum number of		1	
HARQ transmission		-	
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.			

able 9.2.1KB.1	: Te st	Parameters for	Te sting	QPSK FRCs H-Set 10A
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# Table 9.2.1KB.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10A

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 4 \text{ dB}$		
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 <sub>oc</sub>	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 constant power. H test for those TTI	DTE: 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	Propagation	Reference value			
Number	Conditions	HS-PDSCH T-put R (kbps)*			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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					
b	e scaled (multipli	ied 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 <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps)		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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				
b	e scaled (multipli	plied by 2.0). The throughput on each cell should be Reference		
V	alue R.			

#### Table 9.2.1KB.7: Test Parameters for Testing 16QAM FRCs H-Set 10A

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps)		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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.

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		{0,2, 5, 6}	
coding sequence			
Maximum number of		1	
HARQ transmission		-	
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.1: Test Parameters for Testing QPSK FRCs H-Set 10B

#### Table 9.2.1KC.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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					
b	be scaled (multiplied by 3.0)				

Parameter	Unit	Test 1	
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		<i>{</i> 6 <i>,</i> 2 <i>,</i> 1 <i>,</i> 5 <i>}</i>	
coding sequence			
Maximum number of		1	
HARQ transmission		+	
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.3	ו: Test Parameters f	or Testing 16QAM	FRCs H-Set 10B
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Table 9.2.1KC.4: Minimum requirement Enhanced requirement type 3 16QAM, Fixed Reference Channel (FRC) H-Set 10B

Test	Propagation	on Reference value			
Number	Conditions	HS-PDSCH T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 AW GN 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 s erving 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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 9.2.1 KC.5 to 9.2.1 KC.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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied

Test Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps)		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 4.6 dB		
1	VA3	-1.9	2621		
*NOTE 1: T	*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					
V	value R.				

#### Table 9.2.1KC.6: Test requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10B

Table 9.2.1KC.7	': Test Parameters	for Testing <sup>•</sup>	16QAM FRCs H	I-Set 10B
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Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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.
Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and		
constellation version		{0,2, 5, 6}
coding sequence		
Maximum number of		1
HARQ transmission		+
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.1: Test Parameters for Testing QPSK FRCs H-Set	10C
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# Table 9.2.1KD.2: Minimum requirement Enhanced requirement type 3 QPSK, Fixed Reference Channel (FRC) H-Set 10C

Test	Propagation	Reference value	
Number	Conditions	HS-PDSCH T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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			
b	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 AW GN 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 paylo ad 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 9.2.1 KD.5 to 9.2.1 KD.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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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	Propagation	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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			
V	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 <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 8.6 dB	
1	VA3	-1.9	3396	
*NOTE 1: T	NOTE 1: The reference value R is for the Fixed Reference Channel (FRC) H-Set 10			
*NOTE 2: F	or Fixed Referen	nce Channel (FRC) H-Set 10C the reference values for should		
b v	e scaled (multipli alue R.	lied by 4.0). The throughput on each cell should be Reference		

# 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 6

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

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{or}/I_{oc}$ ' = 0 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)	
1	PB3	-6	691	
1	1 05	-3	1359	
2	V/A30	-6	661	
2	V7.00	-3	1327	
NOTE 1: $I_{cc}/I_{cc}$ is computed based on the relations shown in E.5E. (Information only $I_{cc}/I_{cc}$ = -5.27 dB) NOTE 2: The reference value B is for the Fixed Reference Channel (EBC) 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 AW GN 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	1	
- Cell info		
- CHOICE mode		
- Primary CPICH info		
- Primary scrambling code	0	
- Intra-frequency cell id	2	
- Cell info		
- CHOICE mode		
- Primary CPICH info		
- Primary scrambling code	16	
- Intra-frequency cell id	3	
- Cell info		
- CHOICE mode		
- Primary CPICH info		
- Primary scrambling code	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	FDD	
- Primary CPICH info		
- Primary scrambling code	0	
- Downlink DPCH info for each RL		
- DL channelisation code		
- Spreading factor	256	
- Code number	194	

#### Contents of RADIO BEARER SETUP message: AM or UM (Test Loop Mode1)

Information Element	Value/remark	Version
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
- CHOICE mode	FDD	
- Primary CPICH info		
- Primary scrambling code	0	
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
<ul> <li>DL channelisation code</li> </ul>		
- Spreading factor	128	
- Code number	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	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	7	
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
- CHOICE mode FDD	FDD	
- Primary CPICH info		
- Primary scrambling code	0	
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- DL channelisation code		
- Spreading factor	128	
- Code number	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, VA 30) vary.

Table 9.2.1L.3: Tes	t Parameters for	Testing QPS	KFRCsH-Set 6
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Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{or} / I_{oc}$ ' = 0.76 dB	
		HS-PDSCH E./I (dB)	DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)	
		-5.9	691	
1	PB3	-2.9	1359	
2	1/420	-5.9	661	
2	VA30	-2.9	1327	

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

# 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

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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.

able 9.2.1LA.1: Test Parameters	for Testing	QPSK FRCs H-Set	6A
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Parameter	Unit	Test 1	Test 2
Phase reference		P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		{0,2, 5, 6}	
coding sequence			
Maximum number of		4	
HARQ transmission			
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 tes for those TTI intended for the UE.			nuously with le UE under test

Test	Propagation Conditions	Reference value		
Number			T-put R (kbps) *	
			$\hat{I}_{or}/I_{oc}$ ' = 0 dB	
		HS-PDSCH	DIP1 = -2.75 dB DIP2 = -7.64 dB	
		$E_c/I_{or}$ (dB)	(Note 1)	
1	1 PB3	-6	691	
I		-3	1359	
2	\/430	-6	661	
2	V7.50	-3	1327	
NOTE 1: $I_{co}/I_{cc}$ is computed based on the relations shown in E.5E (Information only $I_{co}/I_{cc}$ =				
-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).				

Table 9.2.1LA.2: Minimum requirement Enha	anced requirement type 3i QPSK
Fixed Reference Channel	I (FRC) H-Set 6A

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 no ise 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.5 E 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.5 E 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

- 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.

	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

#### Table 9.2.1LA.2A: Part test configuration

## 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, VA 30) vary.

Fable 9.2.1LA.3: Test Parameters for	Testing	<b>J QPSK</b>	FRCs H	-Set 6A
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Parameter	Unit	Test 1	Test 2
Phase reference		P-0	CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no te ap	est tolerance plied)

Table 9.2.1LA.4: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{\sigma'}/I_{\sigma'}$	= 0 dB,
Fixed Reference Channel (FRC) H-Set 6A	

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{ar} / I_{ac}$ ' = 0.76 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)	
1	PB3	-5.9	691	
1	T D5	-2.9	1359	
2	2 VA30	-5.9	661	
2		-2.9	1327	
NOTE 1: I <sub>cc</sub> /I <sub>cc</sub> ' 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-C	PICH
I <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version		{0,2, 5, 6}	
coding sequence			
Maximum number of			1
HARQ transmission			4
NOTE: The HS-SCCH-	1 and HS-PDSCH shall be t	transmitted conti	inuously with
constant power. for those TTI int	HS-SCCH-1 shall only use ended for the UE.	the identity of th	e UE under test

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{or}$ / $I_{oc}$ ' = 0 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)	
1	PB3	-6	691	
'	1 00	-3	1359	
2	\/430	-6	661	
2	V7.50	-3	1327	
NOTE 1: $I_{\infty}/I_{\infty}$ is computed based on the relations shown in E.5E. (Information only $I_{\infty}/I_{\infty}$ =				
-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)				

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

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 p ayload 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

- 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

	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

Table 9.2.1LB.3: Part test configuration

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, VA 30) vary.

able 9.2.1LB.4: Test Parameters for	or Testing QPSK FRCs H-Set 6A
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Parameter	Unit	Test 1	Test 2
Phase reference		P-0	CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no te ap	st toleranœ plied)

Table 9.2.1LB.5: Test requirement enhanced requirement type 3i QPSK at $\hat{I}_{or}/I_{oc}$ = 0 dl	в,
Fixed Reference Channel (FRC) H-Set 6A	

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{ar} / I_{ac}$ ' = 0.76 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)	
1	PB3	-5.9	691	
1	1 00	-2.9	1359	
2	V/A20	-5.9	661	
2	VASU	-2.9	1327	
NOTE 1: I oct	/loc' is computed	based on the relations sl	hown 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 <sub>oc</sub>	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- constant power for those TTI int	CH-1 and HS-PDSCH shall be transmitted continuously with ver. HS-SCCH-1 shall only use the identity of the UE under tes I intended for the UE.		nuously with le UE under test

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{or}/I_{oc}$ ' = 0 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.75 dB DIP2 = -7.64 dB (Note 1)	
1	DB3	-6	691	
1	FDS	-3	1359	
2	\/430	-6	661	
2 7,50		-3	1327	
NOTE 1: $I_{co}/I_{cc}$ is computed based on the relations shown in E.5E. (Information only $I_{cc}/I_{cc}$ =				
	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)				

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

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.

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

#### 9.2.1LC.4.2 Procedure

- 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.

	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

Table	9.2.1LC.3:	Part test	configuration
Iabio	0.2.120.0.	1 411 1001	oomigaration

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, VA 30) vary.

Γable 9.2.1LC.4: Test Parameters	for Testing	<b>QPSK FRCs</b>	H-Set 6B
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Parameter	Unit	Test 1	Test 2
Phase reference		P-0	CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no te ap	est tolerance plied)

Γable 9.2.1LC.5: Test requirement enhanced requirement type 3i QPSK a	at $\hat{I}_{or} / I_{oc}$ ' = 0 dB,
Fixed Reference Channel (FRC) H-Set 6B	

Test	Propagation	Reference value		
Number	Conditions		T-put R (kbps) *	
			$\hat{I}_{ar} / I_{ac}$ ' = 0.76 dB	
		HS-PDSCH $E_c/I_{or}$ (dB)	DIP1 = -2.58 dB DIP2 = -7.47 dB (Note 1)	
1	PB3	-5.9	691	
•	I FBS	-2.9	1359	
2	1/420	-5.9	661	
2	VA30	-2.9	1327	
NOTE 1: $I_{cc}/I_{cc}$ 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 <sub>oc</sub>	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.			

Test	Propagation	Reference value				
Number	Conditions		T-put R (kbps) *			
			$\hat{I}_{or}/I_{oc}$ ' = 0 dB			
		HS-PDSCH	DIP1 = -2.75 dB DIP2 = -7.64 dB			
		$E_c / I_{or}$ (dB)	(Note 1)			
1	PB3	-6	691			
I	1 05	-3	1359			
2	\/430	-6	661			
2	V7.50	-3	1327			
NOTE 1: I <sub>oc</sub> /	loc' is computed	based on the relations sl	nown in E.5E. (Information only $I_{oc}/I_{oc}$ ' =			
-4	5.27 dB).					
NOTE 2: The reference value R is for the Fixed Reference Channel (FRC) H-Set 6.						
NOTE 3: Fo	r FRC H-Set 6C	the reference value shou	uld be scaled (multiplied by 4.0).			

Table 9.2.1LD.2: Minimum requirement Enha	inced r	requirement type	3i QPSK,
Fixed Reference Channel	(FRC) I	H-Set 6C	

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 no ise 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

- 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

	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

#### Table 9.2.1LD.3: Part test configuration

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, VA 30) 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no te ap	est tolerance plied)

Fable 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	Propagation	F	Reference value		
Number	Conditions		T-put R (kbps) *		
			$\hat{I}_{ar} / I_{ac}$ ' = 0.76 dB		
		HS-PDSCH	DIP1 = -2.58 dB DIP2 = -7.47 dB		
		E <sub>c</sub> / I <sub>or</sub> ( <b>dB</b> )	(Note 1)		
1	PB3	-5.9	691		
·	1 05	-2.9	1359		
2	V/A30	-5.9	661		
2	VA30	-2.9	1327		
NOTE 1: $I_{\infty}/I_{\infty}$ is computed based on the relations shown in E.5E.					
NOTE 2: Th NOTE 3: Fo	e reference value r FRC H-Set 6C	e R is for the Fixed Refe the reference value shou	rence Channel (FRC) H-Set 6. uld 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 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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 t	ne UE.			

# Table 9.2.2A.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	DV3	-6	77	375		
'	175	-3	180	475		
2	DB3	-6	20	183		
2	1 05	-3	154	274		
2	3 VA30	-6	15	187		
5		-3	162	284		
* NOTES: 1	) The reference va	alue R is for the Fixed Refe	erence Channel (FRC) H-Set 1			
2	<ol><li>For Fixed Reference</li></ol>	ence Channel (FRC) H-Set	2 the reference values for R s	hould be scaled		
(	multiplied by 1.5 a	nd rounding to the nearest	integer t-put in kbps, where va	alues 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					
L L	ip io i+ i , 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 <sub>oc</sub>	dBm/3.84 MHz	-60			
Redundancy and					
constellation version		{6,2,1,5}			
coding sequence					
Maximum number of			1		
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 th	he UE.	,			

Table 9.2.2A.4: Minimum	requirement 16QAM.	Fixed Reference	Channel (FRC)	H-Set 1/2/3
	i ioquiioinonit ioq/ani,			,

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 10 dB		
1	DA2	-6	295		
I	FAS	-3	463		
2	DB2	-6	24		
2	FDS	-3	243		
3	\//30	-6	35		
5	VA30	-3	251		
* NOTES: 1	) The reference v	value R is for the Fixed Reference	ce Channel (FRC) H-Set 1		
2	) For Fixed Refe	rence Channel (FRC) H-Set 2 th	e reference values for R should		
b	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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

#### 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.

Fable 9.2.2A.6: Test F	Parameters for Testin	g QPSK FRCs H-S	et 1/H-Set 2/H-Set 3
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Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		applied)

#### Table 9.2.2A.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.8 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.8 dB		
1	PA3	-5.9	77	375		
•	1710	-2.9	180	475		
2	PB3	-5.9	20	183		
2	1 00	-2.9	154	274		
3	V/A30	-5.9	15	187		
3	V7.50	-2.9	162	284		
* NOTES: 1	) The reference v	alue R is for the Fixed Refe	erence Channel (FRC) H-Set 1			
2	<ol><li>For Fixed Reference</li></ol>	ence Channel (FRC) H-Set	t 2 the reference values for R s	hould 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						
l i	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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		applied)

Test	Propagation	Referen	ice value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 10.8 dB		
1	DA2	-5.9	295		
1	FAS	-2.9	463		
2	DB3	-5.9	24		
2	FD3	-2.9	243		
2	1/420	-5.9	35		
3	VASU	-2.9	251		
* NOTES: 1	) The reference	value R is for the Fixed Reference	ce Channel (FRC) H-Set 1		
2	) For Fixed Refe	rence Channel (FRC) H-Set 2 th	e reference values for R should		
b	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					
V	values of i+1/2 are rounded up to i+1, i integer)				

#### Table 9.2.2A.9: Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4.

# 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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			ith constant	
power. HS-	SCCH-1 shall only use the i	dentity of the UI	E under test fo	r those TTI
intended for	the UE.			

Table 9.2.2B.1: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH T-put R (kbps) *		T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \mathbf{dB}$	$\hat{I}_{or}/I_{oc}$ = 10 dB	
1	DV3	-6	70	369	
1	FAS	-3	171	471	
2	DB3	-6	14	180	
2	FDS	-3	150	276	
2	1/420	-6	11	184	
5	VA30	-3	156	285	
* NOTE: Th	OTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4				

#### Table 9.2.2B.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

#### Table 9.2.2B.3: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH T-put R (kbps) *		T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	PA3	-6	116	563		
1	170	-3	270	713		
2	PB3	-6	30	275		
2 105		-3	231	411		
3	\//30	-6	23	281		
5	VA30	-3	243	426		
* NOTE: T	he reference value	Ilue 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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

#### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		applied)

#### Table 9.2.2B.6: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test	Propagation Conditions	Reference value			
Number		HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_{c}^{}/I_{or}^{}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.8 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
1	PA3	-5.9	70	369	
I	170	-2.9	171	471	
2	PB3	-5.9	14	180	
2	1 00	-2.9	150	276	
3	V/A30	-5.9	11	184	
5	V750	-2.9	156	285	
* NOTE: Th	IOTE: 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	Propagation	Reference value           HS-PDSCH         T-put R (kbps)*         T-put R (kbps)*			
Number	Conditions				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
1	DV3	-5.9	116	563	
•	175	-2.9	270	713	
2	DB3	-5.9	30	275	
2	r D5	-2.9	231	411	
3	\//\30	-5.9	23	281	
5	V 7.50	-2.9	243	426	
* NOTE: T	he 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 <sub>oc</sub>	dBm/3.84 MHz		-60	
Redundancy and				
constellation version		{0,2,5,6}		
coding sequence				
Maximum number of		4		
HARQ transmission				
NOTE: The HS-SCC	H-1 and HS-PDSCH sh	hall be transmitte	ed continuously	with constant
power. HS-S0	CCH-1 shall only use th	ne identity of the	UE under test fo	or those TTI
intended for the	he UE.	-		

#### Table 9.2.2C.2: Minimum requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
		-12	N/A	268	
1	PA3	-9	N/A	407	
	175	-6	197	N/A	
		-3	333	N/A	
		-9	N/A	183	
2	PB3	-6	152	288	
		-3	251	N/A	
		-9	N/A	197	
3	VA30	-6	164	307	
		-3	261	N/A	
* NOTES: 2	<ol> <li>The reference v</li> </ol>	alue R is for the Fixed Refe	erence Channel (FRC) H-Set 1		
2	<ol><li>For Fixed Reference</li></ol>	ence Channel (FRC) H-Set	2 the reference values for R s	hould be scaled	
(	multiplied by 1.5 a	ind rounding to the nearest	integer t-put in kbps, where va	alues of i+1/2 are	
rounded up to i+1, i integer)					
3	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				
l	up to i+1, i integer)	-			

Γable 9.2.2C.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Se	et 3
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Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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 temperature of the second sec		ne identity of the	UE under test fo	or 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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	DV3	-9	340	
1	175	-6	513	
2	DB3	-6	251	
2	F D3	-3	374	
3	V/A30	-6	280	
5	VASU	-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 $i+1$ , 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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

# SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

Information Element	Value/remark
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	STTD
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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:	<b>Test Parameters for</b>	<b>Testing QPSK</b>	KFRCs H-Set 1/H-Set 2/H-Set 3
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Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no	o test toleranœ a	applied)

# Table 9.2.2C.7: Test requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB		
		-11.9	N/A	268		
1	PA3	-8.9	N/A	407		
1	175	-5.9	197	N/A		
		-2.9	333	N/A		
		-8.9	N/A	183		
2	PB3	-5.9	152	288		
		-2.9	251	N/A		
		-8.9	N/A	197		
3	VA30	-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						
i	up to i+1, i integer)					

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		

Test	Propagation	F	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB	
1	PA3	-8.9	340	
	17.0	-5.9	513	
2	PB3	-5.9	251	
2		-2.9	374	
3	\//\30	-5.9	280	
3	VASU	-2.9	398	
<ul> <li>* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1</li> <li>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)</li> <li>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)</li> </ul>				

Table 9.2.2C.9: Test requirement Enhance	ed requirement type 1, 16QAM,
Fixed Reference Channel (F	FRC) H-Set 1/2/3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4.

# 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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			or those TTI	

#### Table 9.2.2D.1: Test Parameters for Testing QPSK FRCs H-Set 3

# Table 9.2.2D.2: Minimum requirement Enhanced performance requirements Type 2, QPSK,Fixed Reference Channel (FRC) H-Set 3

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	PΔ3	-6	77	375	
1 175		-3	180	475	
2	2 082	-6	20	183	
2	1 00	-3	154	274	
3	3 VA30	-6	15	187	
5		-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 <sub>oc</sub>	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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 10 dB		
1	PA3	-6	295		
1	175	-3	463		
2	2 082	-6	24		
2	1 00	-3	243		
3	3 VA30	-6	35		
5		-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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

## 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		applied)

# Table 9.2.2D.7: Test requirement Enhanced performance requirements Type 2, QPSK,Fixed Reference Channel (FRC) H-Set 3

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or}/I_{oc}$ = 10.8 dB	
1	PA3	-5.9	77	375	
I	FAS	-2.9	180	475	
2 PB3	DB3	-5.9	20	183	
	1 05	-2.9	154	274	
3	3 VA30	-5.9	15	187	
5		-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	<sup>·</sup> Te sting	16QAM FRCs H-Set 3
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Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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	Propagation Conditions	Reference value			
Number		HS-PDSCH	T-put $R$ (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	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.1: Test Parameters for Testing QPSK FRCs H-Set 3

Table 9.2.2E.2: Minimum requirement Enhanced requirement type 3, QPSK,
Fixed Reference Channel (FRC) H-Set 3

Test	Propagation		Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0  \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
		-12	N/A	268		
1	DA2	-9	N/A	407		
1	FAS	-6	197	N/A		
		-3	333	N/A		
		-9	N/A	183		
2	PB3	-6	152	288		
		-3	251	N/A		
		-9	N/A	197		
3	VA30	-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 <sub>oc</sub>	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	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	DV3	-9	340			
	175	-6	513			
2	DB3	-6	251			
2	FDS	-3	374			
2	\//20	-6	280			
5	VA30	-3	398			
* NOTES: 1	* 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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		applied)

 Table 9.2.2E.6: Test Parameters for Testing QPSK FRCs H-Set 3

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
		-11.9	N/A	268	
1	DA2	-8.9	N/A	407	
I	FAS	-5.9	197	N/A	
		-2.9	333	N/A	
		-8.9	N/A	183	
2	PB3	-5.9	152	288	
		-2.9	251	N/A	
		-8.9	N/A	197	
3	VA30	-5.9	164	307	
		-2.9	261	N/A	
* NOTES: ^ (	1) The reference va Channel (FRC) H-S he nearest integer	lue R is for the Fixed Refe et 3 the reference values f t-put in kbps, where values	rence Channel (FRC) H-Set 1 or R should be scaled (multip of i+1/2 are rounded up to i+	, for Fixed Reference lied by 3 and rounding to 1, i integer)	

# Table 9.2.2E.7: Test requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

#### 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		applied)

# Table 9.2.2E.9: Test requirement Enhanced requirement type 3, 16QAM,Fixed Reference Channel (FRC) H-Set 3

Test	Reference value					
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB			
1	PA3	-8.9	340			
	175	-5.9	513			
2	DB3	-5.9	251			
2	T D5	-2.9	374			
3	1/420	-5.9	280			
5	VA30	-2.9	398			
* NOTES: 1	* 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						
Va	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 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 <sub>oc</sub>	dBm/3.84 MHz	-60		
DPCH frame offset			0	
$( au_{DPCH,n})$	Cnip		0	
Redundancy and				
constellation version coding		{0,2,5,6}		
sequence				
Maximum number of HARQ		1		
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode			I	
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 re	equirement QPSK,	<b>Fixed Reference</b>	Channel (FR	C) H-Set 1/2/3
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Test	Propagation		Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *			
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	DV3	-6	118	399			
•	175	-3	225	458			
2	DB3	-6	50	199			
2	PD3	-3	173	301			
2	1/420	-6	47	204			
5	VA30	-3	172	305			
* NOTES: 7	1) The reference v	alue R is for the Fixed Ref	erence Channel (FRC) H-S	Set 1			
2	2) For Fixed Refer	ence Channel (FRC) H-Se	et 2 the reference values for	r 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						
r	rounded up to i+1. i integer)						

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	•
I <sub>oc</sub>	dBm/3.84 MHz		-60	
DPCH frame offset	Ohim		0	
$(\tau_{DPCH,n})$	Cnip		0	
Redundancy and				
constellation version coding			{6,2,1,5}	
sequence				
Maximum number of HARQ			4	
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode			I	
NOTE: The HS-SCCH-1 and	HS-PDSCH shall be transmit	ted continuous	ly with constant	power. HS-
SCCH-1 shall only use	the identity of the UE under te	est for those TT	I intended for th	e UE.

#### Table 9.2.3A.3: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

#### Table 9.2.3A.4 Minimum requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

Test	Propagation	F	Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps)*	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	PA3	-6	361	
'	170	-3	500	
2	DB3	-6	74	
2	T D5	-3	255	
3	\//\30	-6	84	
5	VA30	-3	254	
<ul> <li>* NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 1</li> <li>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)</li> <li>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)</li> </ul>				

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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	Closed loop mode1
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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, VA 30, 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		oplied)

Table 9.2.3A.7: Tes	st requirement QPSK,	<b>Fixed Reference</b>	<b>Channel (FRC</b>	) H-Set 1/2/3
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Test	Propagation			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB
1	PA3	-5.9	118	399
	170	-2.9	225	458
2	DB3	-5.9	50	199
2	FDJ	-2.9	173	301
3	\//30	-5.9	47	204
3	VA30	-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				

Table 9.2.3A.8: Test Parameters for Testing 16QAM FRCs H-Set 1/H-Set 2/H-Set 3

rounded up to i+1, i integer)

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		pplied)

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *			
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB			
1	DA2	-5.9	361			
1	F AS	-2.9	500			
2	DB3	-5.9	74			
2	PD3	-2.9	255			
2	1/420	-5.9	84			
3	VASU	-2.9	254			
* NOTES: 1	)The reference v	alue R is for the Fixed R	eference 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						
b	e scaled (multipl	ied by 3 and rounding to	the nearest integer t-put in kbps, where			
v	values of i+1/2 are rounded up to i+1, i integer)					

#### Table 9.2.3A.9 Test requirement 16QAM, Fixed Reference Channel (FRC) H-Set 1/2/3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4

### 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz		-60	
DPCH frame offset	Ohin			
$(\tau_{DPCH,n})$	Chip		0	
Redundancy and				
constellation version coding		{0,2,5,6}		
sequence				
Maximum number of HARQ		1		
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode			I	
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.1: Test Parameters for Testing QPSK FRCs H-Set 4/H-Set 5

#### Table 9.2.3B.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 4

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_{c}^{}/I_{or}^{}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	DV3	-6	114	398	
•	175	-3	223	457	
2	DB3	-6	43	196	
2	r D5	-3	167	292	
3	\//\30	-6	40	199	
5	VA30	-3	170	305	
* NOTE: Th	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put $R$ (kbps) *	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$I_{or} / I_{oc} = 0 \text{ dB}$	$I_{or}/I_{oc}$ = 10 dB
1	1 PA3	-6	177	599
1		-3	338	687
2	2 002	-6	75	299
2 PB3	-3	260	452	
3	VA30	-6	71	306
		-3	258	458
* NOTE: 1	E: 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 0.153 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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FDI bit	
- CHOICE mode	FDD
- TX Diversity Mode	Closed loop mode1
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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, VA 30, 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		applied)

Table 9.2.3B.5:	Test Parameters for	<b>Testing QPSK</b>	FRCs H-Set 4/H-Set 5

Table 9.2.3B.6: Test requirement QPS	K, Fixed Reference Channel (FRC) H-Set 4
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Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		T-put $R$ (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
1	PA3	-5.9	114	398	
I		-2.9	223	457	
2	002	-5.9	43	196	
Z	2 PB3	-2.9	167	292	
S	\//\30	-5.9	40	199	
5	VA30	-2.9	170	305	
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 4					

Test	Propagation		Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
1	1 042	-5.9	177	599	
1	FAS	-2.9	338	687	
2	DB2	-5.9	75	299	
2	2 PB3	-2.9	260	452	
2	1/420	-5.9	71	306	
5	VASU	-2.9	258	458	
* NOTE: The reference value R is for the Fixed Reference Channel (FRC) H-Set 5					

#### Table 9.2.3B.7: Test requirement QPSK, Fixed Reference Channel (FRC) H-Set 5

### 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference		P-CPICH		
I <sub>oc</sub>	dBm/3.84 MHz	-60		
DPCH frame offset	Chip		٥	
$(\tau_{DPCH,n})$	Chip		0	
Redundancy and				
constellation version coding			{0,2,5,6}	
sequence				
Maximum number of HARQ			1	
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode		'		
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-				t power. HS-
SCCH-1 shall only	use the identity of the UE u	nder test for tho	se TTI intended fo	r the UE.

Table 9.2.3C.1: Test Parameters for Testing QPSK FRCs H-Set 1/H-Set 2/H-Set 3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4

Test	Propagation		Reference value	
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *
		$E_c / I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0  \mathbf{dB}$	$\hat{I}_{or}/I_{oc}$ = 10 dB
		-12	N/A	297
1	DA2	-9	N/A	410
I	FAS	-6	242	N/A
		-3	369	N/A
		-9	N/A	194
2 PB3	-6	170	308	
		-3	272	N/A
		-9	N/A	204
3	VA30	-6	172	315
		-3	270	N/A
NOTES: 2 ( r c	<ol> <li>The reference values</li> <li>For Fixed Reference</li> <li>For Fixed by 1.5 and the provided up to i+1,</li> <li>For Fixed Reference</li> <li>For Fixed Reference</li> <li>For Fixed by 3 and the provided by 3 a</li></ol>	alue R is for the Fixed Rep ence Channel (FRC) H-Se nd rounding to the neares i integers) ence Channel (FRC) H-Se I rounding to the nearest	ference Channel (FRC) H-S at 2 the reference values for at integer t-put in kbps, wher at 3 the reference values for integer t-put in kbps, where	et 1 R should be scaled e values of i+1/2 are R should be scaled values of i+1/2 are round

# Table 9.2.3C.2: Minimum requirement Enhanced requirement type 1, QPSK, Fixed Reference Channel (FRC) H-Set 1/2/3

#### 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	Ohin		0	
$( au_{DPCH,n})$	Chip		0	
Redundancy and				
constellation version coding			{6,2,1,5}	
sequence				
Maximum number of HARQ			1	
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode			I	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-				ower. 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	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	PA3	-9	376		
•	175	-6	532		
2	DB3	-6	267		
2	r b5	-3	393		
3	\//\30	-6	279		
5	V7.50	-3	404		
* NOTES: 1 2	* 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				
b	e scaled (multipl	ied by 1.5 and rounding t	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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	Closed loop mode1
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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 relevant 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, VA 30, 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or} / I_{oc}$ = 10.8 dB		
		-11.9	N/A	297		
1	DV3	-8.9	N/A	410		
I	FAJ	-5.9	242	N/A		
		-2.9	369	N/A		
		-8.9	N/A	194		
2	PB3	-5.9	170	308		
		-2.9	272	N/A		
		-8.9	N/A	204		
3	VA30	-5.9	172	315		
		-2.9	270	N/A		
<ul> <li>* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1</li> <li>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)</li> <li>3) For Fixed Reference Channel (FRC) H-Set 3 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)</li> </ul>						
( r	ounded up to i+1,	i integer)	integer t-put in Kops, where	values of i+1/2 are		

# Table 9.2.3C.7: Test requirement Enhanced requirement type 1, QPSK,Fixed Reference Channel (FRC) H-Set 1/2/3

#### 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 <sub>oc</sub>	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	Propagation	F	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps)*		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB		
1	DV3	-8.9	376		
•	F AS	-5.9	532		
2	DB3	-5.9	267		
Z	FDS	-2.9	393		
2	1/420	-5.9	279		
5	VASU	-2.9	404		
* NOTES: 1	)The reference v	alue R is for the Fixed R	eference Channel (FRC) H-Set 1		
2	) For Fixed Refe	rence Channel (FRC) H-	Set 2 the reference values for R should		
b	e scaled (multipl	ied by 1.5 and rounding t	to the nearest integer t-put in kbps,		
v	here 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.

Parameter	Unit	Test 1			
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
DPCH frame offset	Chin	0			
$(\tau_{DPCH,n})$	Chip	0			
Redundancy and					
constellation version		{0,2,5,6}			
coding sequence					
Maximum number of		Λ			
HARQ transmission					
Feedback Error Rate	%	4			
Closed loop timing		1			
adjustment mode		I			
NOTE: The HS-SCCI	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.1: Test Parameters for Testing QPSK FRCs H-Set 6

# Table 9.2.3D.2: Minimum requirement Enhanced requirement type 2 QPSK,Fixed Reference Channel (FRC) H-Set 6

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH T-put R (kbps) *				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB			
1	PB3	-3	1536			

Parameter	Unit	Test 1			
Phase reference		P-CPICH			
I <sub>oc</sub>	dBm/3.84 MHz	-60			
DPCH frame offset	Chin	0			
$(\tau_{DPCH,n})$	Chip 0				
Redundancy and constellation version		/6 2 1 5			
coding sequence	coding sequence				
Maximum number of HARQ		Λ			
transmission					
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.3: Test Parameters for Testing 16-QAM FRCs H-Set 6

Table 9.2.3D.4: Minimum requirement Enhanced requirement type 2 16QAM,Fixed Reference Channel (FRC) H-Set 6

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH T-put R (kbps) *				
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	dBm/3.84 MHz		-60	
DPCH frame offset	Ohin		0	
$(\tau_{DPCH,n})$	Chip		0	
Redundancy and				
constellation version coding		{0,2,5,6}		
sequence				
Maximum number of HARQ			Λ	
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing		1		
adjustment mode		I		
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 perf	formance requirements Type 2, QPS K,
Fixed Reference Channel (	FRC) H-Set 3

Test	Propagation	Reference value				
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \mathbf{dB}$	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB		
1	PA3	-6	118	399		
•	170	-3	225	458		
2	DB3	-6	50	199		
2	FDS	-3	173	*Note 2		
2	1/420	-6	47	204		
5	VASU	-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	2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7,					
6	8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $\hat{I}_{or}/I_{oc}$ =10dB and $\frac{E_c/I_{or}}{E_c}$ =-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 <sub>oc</sub>	dBm/3.84 MHz		-60		
DPCH frame offset	Chin		0		
$(\tau_{DPCH,n})$	Chip		0		
Redundancy and					
constellation version coding			{6,2,1,5}		
sequence					
Maximum number of HARQ			4		
transmission			т		
Feedback Error Ratio	%		4		
Closed loop timing			1		
adjustment mode			I		
NOTE: The HS-SCCH-1 and	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					

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, 10	6QAM,
Fixed Reference Channel (FRC) H-Set 3	

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	ΡΔ3	-6	361	
1	170	-3	500	
2	DB3	-6	74	
2	1 05	-3	*Note 2	
3	V/A30	-6	84	
5	VASU	-3	254	
* NOTES: 1	) The reference v	value R is for the Fixed R	Reference Channel (FRC) H-Set 1, for	
F	ixed Reference (	Channel (FRC) H-Set 3 t	he reference values for R should be	
S	caled (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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

Information Element	Value/remark
CHOICE channel requirement	Uplink DPCH info
- Number of FBI bit	1
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	Closed loop mode1
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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, VA 30, 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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub> dBm/3.84 MHz		-60 (no test tolerance applied)

Table 9.2.3D.10: Test Parameters for Testing QPSK FRCs H-Set 6

# Table 9.2.3D.11: Test requirement Enhanced requirement type 2 QPSK,Fixed Reference Channel (FRC) H-Set 6

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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 <sub>oc</sub>	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 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 <sub>oc</sub>	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	Propagation	Reference value			
Number	Conditions	HS-PDSCH	HS-PDSCH T-put R (kbps) *		
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0.8 \text{ dB}$	$\hat{I}_{or} / I_{oc}$ = 10.8 dB	
1	PA3	-5.9	118	399	
•	170	-2.9	225	458	
2	PB3	-5.9	50	199	
2	1 80	-2.9	173	*Note 2	
3 \//\20		-5.9	47	204	
3	VA30	-2.9	172	305	
* NOTES: 1) The reference value R is for the Fixed Reference Channel (FRC) H-Set 1, for Fixed					
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	2) Closed loop transmit diversity enhanced performance requirements type 2 for Categories 7,				
8	8, 9, 10, 13 and 14 in Pedestrian B 3km/h with $I_{or}/I_{oc}$ =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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		plied)

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}/I_{oc}$ = 10.8 dB	
1	PA3	-5.9	361	
I	176	-2.9	500	
2	DB3	-5.9	74	
2	T D5	-2.9	*Note 2	
3	\/430	-5.9	84	
5	V7.50	-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				
s	caled (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.17 Test requirement Enhanced performance requirements Type 2, 16QAM, Fixed Reference Channel (FRC) H-Set 3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4

### 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.

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz		-60	
DPCH frame offset				
$( au_{DPCH,n})$	Chip		0	
Redundancy and				
constellation version coding		{0,2,5,6}		
sequence				
Maximum number of HARQ		Λ		
transmission		7		
Feedback Error Ratio	%	4		
Closed loop timing			1	
adjustment mode				
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-				t 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.1: Test Parameters for Testing QPSK FRCs H-Set 3

# Table 9.2.3E.2: Minimum requirement Enhanced requirement type 3, QPSK,Fixed Reference Channel (FRC) H-Set 3

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc} = 0 \ \mathbf{dB}$	$\hat{I}_{or}/I_{oc}$ = 10 dB
		-12	N/A	297
1	DA2	-9	N/A	410
1	175	-6	242	N/A
		-3	369	N/A
		-9	N/A	194
2	PB3	-6	170	308
		-3	272	N/A
		-9	N/A	204
3	VA30	-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 Parame	ters for Testing	16QAM FRO	Cs H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz		-60	
DPCH frame offset	Chin		0	
$(\tau_{DPCH,n})$	Chip	0		
Redundancy and				
constellation version coding			{6,2,1,5}	
sequence				
Maximum number of HARQ			4	
transmission			4	
Feedback Error Ratio	%		4	
Closed loop timing			1	
adjustment mode			I	
NOTE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant power. HS-				ower. HS-
SCCH-1 shall only use the identity of the UE under test for those TTI intended for the UE.				

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10 dB	
1	PA3	-9	376	
•	175	-6	532	
2	DB3	-6	267	
2	T D5	-3	393	
3	\//\30	-6	279	
5	V 7.50	-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				
s	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.4: Minimum requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

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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, VA 30, 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.

able 9.2.3E.6: Test Parameters for	or Testing QPSK FRCs H-Set 3
------------------------------------	------------------------------

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no	test tolerance ap	plied)

# Table 9.2.3E.7: Test requirement Enhanced requirement type 3, QPSK, Fixed Reference Channel (FRC) H-Set 3

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	T-put R (kbps) *	T-put R (kbps) *
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 0.8 dB	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB
		-11.9	N/A	297
1	DA2	-8.9	N/A	410
1	FAS	-5.9	242	N/A
	-2.9	369	N/A	
		-8.9	N/A	194
2	PB3	-5.9	170	308
		-2.9	272	N/A
		-8.9	N/A	204
3	VA30	-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:	<b>Test Parameters for</b>	<sup>r</sup> Testing	16QAM FRCs	H-Set 3

Parameter	Unit	Test 1	Test 2	Test 3
Phase reference			P-CPICH	-
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)		pplied)

Test	Propagation	Reference value			
Number	Conditions	HS-PDSCH	T-put R (kbps) *		
		$E_c / I_{or}$ (dB)	$\hat{I}_{or}$ / $I_{oc}$ = 10.8 dB		
1	PA3	-8.9	376		
'	I FAS	-5.9	532		
2	2 PB3	-5.9	267		
2		-2.9	393		
2	1/420	-5.9	279		
5	VASU	-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					
V	values of i+1/2 are rounded up to i+1, i integer)				

#### Table 9.2.3E.9: Test requirement Enhanced requirement type 3, 16QAM, Fixed Reference Channel (FRC) H-Set 3

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause F.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in clause F.4

### 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 precoding vector corresponds to the highest reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector shall be applied to the 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz		-6	60	
DPCH frame offset (т <sub>DPCH,n</sub> )	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK			SK
Maximum number of HARQ transmission		4			
MIMO N_cqi_typeA/M_cqi ratio		1/	1	1/	2
PCI/CQI reporting Error Rate	%	0		C	)
Number of transport blocks		2 1			
Modulation		Primary T Block: 1 Secondary Block:	ransport 6QAM Transport QPSK	Primary T Block: 1 Secondary Block is r	ransport 6QAM Transport not used.

Table 9.2.4A.1: Test Parameters for Testing MIMO FRC H-Set 9

# Table 9.2.4A.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9 with downlinkphysical channel setup in Table E.5.2

Test	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c/I_{or}$ = -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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	Not Present

#### RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
Secondary 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
Dhasa rafaranaa				P-	P-CPICH
Priase reference		P-CPICH	P-CPICH	CPICH	
I	dBm/3.84 MHz	-60 (no tes	t toleranœ	-60 (r	no test
1 <sub>OC</sub>		appl	ied)	tolerance	e 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	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_{c}/I_{or}$ = -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 C QI 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 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.

Parameter	Unit	Test 1
$I_{oc}$	dBm/3.84 MHz	-60
DPCH frame offset	Chin	0
$(\tau_{DPCH,n})$	Omp	Ū
Redundancy and constellation version coding sequence		{0,3,2,1} for 16QAM and 64QAM
Maximum number of		Λ
HARQ transmission		4
MIMO		
N_cqi_typeA/M_cqi		1/1
ratio		
PCI/CQI reporting Error Rate	%	0
Number of transport		0
blocks		2
Modulation		Primary Transport Block: 64QAM Secondary Transport Block: 16QAM

Table 9.2.4B.1: Test Parameters for Testing MIMO FRC H-Set 11

 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	Propagation	Reference value	
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_{c}/I_{or}$ = -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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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	ACK on the Primary stream (64QAM)	NACK on the Primary stream
Secondary 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.

1

Parameter	Unit	Test 1
I <sub>oc</sub>	dBm/3.84 MHz	-60
DPCH frame offset	Chin	0
$( au_{DPCH,n})$	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	Propagation	Reference value	
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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 precoding vector corresponds to the highest reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector shall be applied to the 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz	-60			
DPCH frame offset (т <sub>DPCH,n</sub> )	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK		SK	
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 T Block: 1 Secondary Block:	ransport 6QAM Transport QPSK	Primary T Block: 1 Secondary Block is r	ransport 6QAM Transport iot used.

Table 9.2.4C.1: Test Parameters for Testing MIMO FRC H-Set 9A

# Table 9.2.4C.2: Minimum requirement MIMO, Fixed Reference Channel (FRC) H-Set 9A with downlinkphysical channel setup in Table E.5.2

Test Number	Propagation	Reference value		
	Conditions		T-put <i>R</i> (kbps) * HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c/I_{or}$ = -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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
Secondary 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	dBm/2.84 MHz	-60 (no tes	t tolerance	-60 (no test	tolerance
I <sub>OC</sub>	UDI11/3.04 WI 12	арр	lied)	appli	ed)

# 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	Reference value	
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c/I_{or}$ = -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) Fo	or Fixed Referenc uld be scaled (mu	ce Channel (FRC) H-Set 9A Itiplied by 2.0)	A the reference values for R

# 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 preferred primary precoding vector corresponds to the highest reported CQI value, the preferred primary precoding vector shall be applied to the 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz	-60			
DPCH frame offset (т <sub>DPCH,n</sub> )	Chip	0			
Redundancy and constellation version coding sequence		{0,3,2,1} for 16-QAM and QPSK		SK	
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		1	
Modulation		Primary T Block: 1 Secondary Block: 0	ransport 6QAM Transport QPSK	Primary <sup>-</sup> Block: Secondary Block is	Transport 16QAM Transport not used.

Table 9.2.4CA.1: Test Parameters for Testing MIMO FRC H-Set 9A

# 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	Reference value		
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c / I_{or}$ = -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				
<ol><li>For Fixed Reference Channel (FRC) H-Set 9A the reference values for R</li></ol>				
should	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	Not Present

#### RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/2
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	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.
- 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 loc 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	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
Secondary stream		
ACK on the secondary stream (QPSK)	(17568 + 9736) bit per TTI	9736 bit per TTI
NACK on the secondary	17568 bit per TTI	0 bit per TTI (also counted in case of statDTX)
Sueam		(also counted in case of state TX)

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 dBm/3.84 MHz		-60 (no tes	t toleranœ	-60 (no test	tolerance
I <sub>OC</sub>		app	applied) applied		ed)

# 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	Reference value	
	Conditions		T-put <i>R</i> (kbps) * HS-PDSCH
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_{c}/I_{or}$ = -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 precoding vector corresponds to the highest 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.

Parameter	Unit	Test 1	
I <sub>oc</sub>	dBm/3.84 MHz	-60	
DPCH frame offset	Chip	0	
$( au_{DPCH,n})$	Cinp	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.1: Test Parameters for Testing MIMO FRC H-Set 11A

# 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		Reference value	
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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	
<ul> <li>Precoding weight set restriction</li> </ul>	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	ACK on the Primary stream (64QAM)	NACK on the Primary stream
Secondary 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset (T <sub>DPCH,n</sub> )	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	
			T-put <i>R</i> (kbps)* HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c / I_{or}$ = -1.4dB
1	PA3	18.8	9980
* NOTES: 1)The 2) Fo shoul	The reference value R is for the Fixed Reference Channel (FRC) H-Set 11 For Fixed Reference Channel (FRC) H-Set 11A the reference values for R nould 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,

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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.

Parameter	Unit	Test 1
I <sub>oc</sub>	dBm/3.84 MHz	-60
DPCH frame offset	Chin	0
$( au_{DPCH,n})$	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.1: Test Parameters for Testing MIMO FRC H-Set 11A

# 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		Reference value	
Conditions			T-put <i>R</i> (kbps)* HS-PDSCH
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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.
- 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	ACK on the Primary stream (64QAM)	NACK on the Primary stream
Secondary stream		
ACK on the secondary	(26504 + 17568) bit per TTI	17568 bit per TTI
stream (16QAM)		
NACK on the secondary	26504 bit per TTI	0 bit per TTI
stream		(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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset (т <sub>DPCH,n</sub> )	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	Reference value		
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c / I_{or}$ = -1.4dB	
1	PA3	18.8	9980	
<ul> <li>NOTES: 1)The reference value R is for the Fixed Reference Channel (FRC) H-Set 11</li> <li>2) For Fixed Reference Channel (FRC) H-Set 11A the reference values for R should be scaled (multiplied by 2.0)</li> </ul>				

## 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 corresponds to the highest 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz		-6	0	
DPCH frame offset (т <sub>DPCH,n</sub> )	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		2	
PCI/CQI reporting Error Rate	%	0 0		)	
Number of transport blocks		2 1			
Modulation		Primary Transport Block: 16QAM Secondary Transport Block: QPSK Primary Trans Block: 16QA Secondary Transport Block: 0PSK		ransport I6QAM Transport not used.	

Table 9.2.4E.1: Test Parameters for Testing MIMO FRC H-Set 9

# 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	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps) * HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c/I_{or}$ = -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				
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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 0.153 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
<ul> <li>Precoding weight set restriction</li> </ul>	Not Present

#### RADIO BEARER SETUP for HSDPA Tests 3 & 4

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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	ACK on the Primary stream (16 QAM)	NACK on the Primary stream
Secondary stream		
ACK on the secondary	(17568 + 9736) bit per TTI	9736 bit per TTI
stream (QPSK)		
NACK on the secondary	17568 bit per TTI	0 bit per TTI
stream		(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
		Both P-CPICH	Both P-CPICH	Both P-CPICH	Both P-CPICH
Phase reference		S-CPICH	S-CPICH	S-CPICH	S-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)		-60 (no test tole	ranœ 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	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH	
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c/I_{or}$ = -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				

### 9.2.4F 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 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.

Unit	Test 1
Onic	163(1
dBm/3.84 MHz	-60
Chin	0
Chip	0
	(0.2.2.1) for 160AM
	and 64QAM
	4
	4
	1/1
0/	0
70	0
	2
	2
	Primary Transport
	Block: 64QAM
	Secondary Transport
	Block: 16QAM
	Unit dBm/3.84 MHz Chip

Table 9.2.4F.1: Test Parameters for Testing MIMO FRC H-Set 11

# 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	Propagation	Reference value		
Number	Conditions		T-put <i>R</i> (kbps) HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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

Information Element	Value/remark
MIMO parameters	
- MIMO operation	Start
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
<ul> <li>Precoding weight set restriction</li> </ul>	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	ACK on the Primary stream (64QAM)	NACK on the Primary stream	
Secondary stream			
ACK on the secondary	(26504 + 17568) bit per TTI	17568 bit per TTI	
stream (16QAM)			
NACK on the secondary	26504 bit per TTI	0 bit per TTI	
stream		(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.

Parameter	Unit	Test 1
I <sub>oc</sub>	dBm/3.84 MHz	-60
DPCH frame offset (T <sub>DPCH,n</sub> )	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.4: Test Parameters for Testing MIMO Fixed Reference Channel (FRC) H-Set 11

 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	Propagation	Reference value		
Number	Conditions	T-put R (kbps) HS-PDSCH		
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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 Down link 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 precoding vector corresponds to the highest reported by the UE indicates a preference for two transport blocks, and the preferred primary precoding vector shall be applied to the 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.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz	-60			
DPCH frame offset	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		C	
Number of transport blocks		2 1			
Modulation		Primary T Block: 1 Secondary Block: 0	ransport 6QAM Transport QPSK	Primary T Block: 1 Secondary Block is r	ransport 6QAM Transport ot used.

Table 9.2.4G.1: Test Parameters for Testing MIMO FRC H-Set 9A

# 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	Reference value		
	Conditions	T-put R (kbps) HS-PDSCH		
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c / I_{or} = -2 \text{ dB}$	
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	e Channel (FRC) H-Set 9A the reference values for R		
should	bescaled (multip	iplied 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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.
- 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	ACK on the Primary stream (16 QAM)	NACK on the Primary stream	
Secondary 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 <sub>oc</sub>	dBm/3.84 MHz	-60			•
DPCH frame offset (т <sub>DPCH,n</sub> )	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		2	
PCI/CQI reporting Error Rate	%	0 0		)	
Number of transport blocks		2 1			
Modulation		Primary T Block: 1 Secondary Block:	ransport 6QAM Transport QPSK	Primary T Block: Secondary Block is r	ransport I6QAM Transport not used.

Test Number	Propagation	Reference value		
	Conditions	T-put <i>R</i> (kbps)* HS-PDSCH		
		$\hat{I}_{_{or}}$ / $I_{_{oc}}$ (dB)	$E_c/I_{or}$ = -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) Fo	or Fixed Reference	nce Channel (FRC) H-Set 9A the reference values for R		
shou	uld be scaled (mu	ultiplied by 2.0)		

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

### 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 corresponds to the highest 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.

Parameter	Unit	Test 1
I <sub>oc</sub>	dBm/3.84 MHz	-60
DPCH frame offset	Chin	0
$( au_{DPCH,n})$	Chip	0
Redundancy and		{0,3,2,1} for 16QAM and
sequence		64QAM
Maximum number of HARQ		1
transmission		+
MIMO N_cqi_typeA/M_cqi		1/1
ratio		1/1
PCI/CQI reporting Error	%	0
Rate	,0	3
Number of transport blocks		2
		Primary Transport Block:
Modulation		64QAM
wodulation		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	Reference value			
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH		
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_{c}/I_{or}$ = -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	l be scaled (multip	olied 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
<ul> <li>MIMO pilot configuration</li> </ul>	
- 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 -3d B 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	ACK on the Primary stream (64QAM)	NACK on the Primary stream
Secondary stream		
ACK on the secondary	(26504 + 17568) bit per TTI	17568 bit per TTI
stream (16QAM)		
NACK on the secondary	26504 bit per TTI	0 bit per TTI
stream		(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/Io r 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 <sub>oc</sub>	dBm/3.84 MHz	-60 (no test tolerance applied)
DPCH frame offset (т <sub>DPCH,n</sub> )	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	Reference value		
	Conditions		T-put <i>R</i> (kbps)* HS-PDSCH	
		$\hat{I}_{or}$ / $I_{oc}$ (dB)	$E_c / I_{or}$ = -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				
shoul	d be scaled (mult	iplied 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.

P	arameter	Unit	Test 1	Test 2	Test 3
	$\hat{I}_{or} / I_{oc}$	dB	0	5	10
	I <sub>oc</sub>	dBm/3.84 MHz		-60	
Pha	se reference	-		P-CPICH	
HS-P	$PDSCH E_c / I_{or}$	dB		-3	
HS-S0	CCH_1 $E_c / I_{or}$	dB		-10	
DF	PCH $E_c / I_{or}$	dB		-10	
Maxim H-ARC	ועד number of לtransmission	-	1		
Number to b	of HS-SCCH set e monitored	-		1	
CQI fe	eedback cycle	ms		2	
CQI re	epetition factor	-	1		
HS-SC	CH-1 signalling pattern	1 signalling tern 			
Note1:	te1: Measurement power offset " $\Gamma$ " is configured by RRC accordingly and as defined				nd as defined
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:	<ol> <li>HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25 214</li> </ol>				
NOTE 4:	E 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.				S-PDSCH shall
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.			QAM/non- 14.	

Table 9.3.1.1: Test Parameters for CQI test in AWGN - single link

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+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.

TADIE 9.3. 1.2. CONTENTS OF RADIO DEARER SET OF MESSAGE AND OF UNI (HSDFA	9.3.1.2: Contents of RADIO BEARER SETUP mess	sage: AM or UM	(HSDPA)
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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
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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 F	PDU size of 112 is used. For other UE
categories, MAC-d PDU sizes of 112 and 4	48 are used. Less than CQI value of 23
according to [5], 112 is used, and above the	e 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.
- 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)  $\leq$  Median CQI  $\leq$  (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 go to step 7), otherwise go to step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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 )  $\geq 0.1$ 

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  $\pm -2$  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.

Paramet	er	Unit	Test 1
$\hat{I}_{or} / I_{oc}$		dB	15
I <sub>oc</sub>		dBm/3.84 MHz	-60
Phase refer	ence	-	P-CPICH
HS-PDSCH	$E_c / I_{or}$	dB	-2
HS-SCCH_1	$E_c / I_{or}$	dB	-12
DPCH E <sub>c</sub>	I	dB	-12
Maximum nun H-ARQ transr	nberof nission	-	1
Number of HS-S to be monit	CCHset ored	-	1
CQI feedback	cycle	ms	2
CQI repetition factor		-	1
HS-SCCH-1 si pattern	H-1 signalling attern - To incorporate inter-TTI=3 the six sul HS-SCCH-1 signalling pattern shall b "XOOXOO", where "X" indicates which the HS-SCCH-1 uses the iden the UE under test, and "O" indicates which the HS-SCCH-1 uses a differe identity.		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: Measu	irement pov	ver offset "Г" is cor	figured by RRC accordingly and as defined
NOTE 2: TF for based chann descril	HS-PDSCH on median el paramete bed in TS25	l is configured acc CQI, median CQI - ers are configured a 5.214	ording to the reported CQI statistics. TF 1, median CQI+2 are used. Other physical according to the CQI mapping table
NOTE 3: HS-PE descril	SCH Ec/lo	r is decreased acα 5 214	ording to reference power adjustment $\Delta$
NOTE 4: For an be trar	y given tran	sport format the po ntinuously with con	ower of the HS-SCCH and HS-PDSCH shall stant power.
NOTE 5: The U tables	E shall be c according t	onfigured in 64QAl o TS 25.214.	M/non-MIMO mode and use appropriate CQI

Table 9.3.1A.1: Test Parameters for CQI test in AWGN, 64QAM - single link

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+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		
- Downlink 64QAM configured	TRUF	Rel-7
- Added or Reconfigured DL TrCH information		
- CHOICE DL parameters	HS-DSCH	
- HARO 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		Rel-7
queue		
- 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 valu	le.	L

- 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)  $\leq$  Median CQI  $\leq$  (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 go to step 7), otherwise go to step 8)

 The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $) \ge 0.1$ 

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 -1) shall be less than or equal to 0.1.

Parameter	Unit	Test 1
$\hat{I}_{or1}$ / $I_{oc}$	dB	0
$\hat{I}_{or2}$ / $I_{oc}$	dB	10
I <sub>oc</sub>	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.
<ul> <li>NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8]</li> <li>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]</li> </ul>		
<ul> <li>NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214 [5]</li> <li>NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.</li> </ul>		
CQI tables according to TS 25.214 [5].		

Table 9.3.1B.1: Test Parameters for CQI test in AWGN - single link

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 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.
- 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	

Information Element	Value/Remark	Version
Downlink HS-PDSCH Information		
- HS-SCCH Info		
- CHOICE mode	FDD	
- DL Scrambling Code		
<ul> <li>HS-SCCH Channelisation Code Info</li> </ul>		
- HS-SCCH Channelisation Code	2	
<ul> <li>Measurement Feedback Info</li> </ul>		
- CHOICE mode	FDD	
<ul> <li>Measurement Power Offset</li> </ul>	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		
<ul> <li>CHOICE DL parameters</li> </ul>	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning	Explicit	
- Process Memory Size	The value of Nir of CQI table specified	
	according to TS 25.214 [5] clause 6A.2.3	
- Process Memory Size	The value of Nir of CQI table specified	
	according to TS 25.214 [5] clause 6A.2.3	
Downlink information per radio link list		
<ul> <li>Downlink information for each radio link</li> </ul>		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
<ul> <li>DL channelisation code</li> </ul>		
- 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	

#### Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

- 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 CQI reports. 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 )  $\geq 0.1$ 

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 +2) shall be greater than 0.1. If the HS-PDSCH BLER, for any of the cells, using the transport format indicated by (cell-specific median CQI -1) shall be less than or equal to 0.1.

Parameter		Unit	Test 1
Î	or1 / I <sub>oc</sub>	dB	0
Î	or2 / I <sub>oc</sub>	dB	10
	I <sub>oc</sub>	dBm/3.84 MHz	-60
Phas	se reference	-	P-CPICH
HS-PI	$DSCH_{E_c}/I_{or}$	dB	-3
HS-SC	CH_1 $E_c / I_{or}$	dB	-10
DP	CH E <sub>c</sub> / I <sub>or</sub>	dB	-10
Maxim H-ARC	um number of ≀transmission	-	1
Number of to be	of HS-SCCH set e monitored	-	1
CQI fe	edback cycle	ms	2
CQI re	petition 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 "I" 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/lor is decreased according to reference power adjustment $\Delta$ 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 9.3.1BA.1: Test Parameters for CQI test in AWGN - single link

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 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.
- 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- Measurement Feedback Info		
- CHOICE mode	FDD	
- Measurement Power Offset	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	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning		
- Process Memory Size	The value of Nik of CQI table specified	
	according to 1S 25.214 [5] clause 6A.2.3	
- Process Memory Size	I ne value of Nik of CQI table specified	
Desculture in forma of an an an all a line line t	according to 15 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	

<sup>2)</sup> 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)  $\leq$  (cell specific Median CQI)  $\leq$  (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 CQI reports. 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 )  $\ge 0.1$ 

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 -1) shall be less than or equal to 0.1.

Parameter	Unit	Test 1		
$\hat{I}_{or1}$ / $I_{oc}$	dB	0		
$\hat{I}_{or2} / I_{oc}$	dB	10		
I <sub>oc</sub>	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 <sub>c</sub> / I <sub>or</sub>	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 po in 25.331 [8]	wer offset "Γ" is cor	figured by RRC accordingly and as defined		
NOTE 2: TF for HS-PDSC based on mediar channel paramet described in TS2	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/lo described in TS 2	3: HS-PDSCH Ec/lor is decreased according to reference power adjustment $\Delta$ described in TS 25 214 [5]			
NOTE 4: For any given tra be transmitted co	: 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 CQI tables accor	The UE shall be configured in non-64QAWnon-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.1BB.1: Test Parameters for CQI test in AWGN - single link

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 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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)  $\leq$  (cell specific Median CQI)  $\leq$  (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 CQI reports. 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 )  $\ge 0.1$ 

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</td>

   > 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 -1) shall be less than or equal to 0.1.

Parameter	Unit	Test 1		
$\hat{I}_{or1} / I_{oc}$	dB	0		
$\hat{I}_{or2}$ / $I_{oc}$	dB	10		
I <sub>oc</sub>	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 po in 25.331 [8]	Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8]			
NOTE 2: TF for HS-PDSC based on mediar channel paramet described in TS2	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/lo described in TS	HS-PDSCH Ec/lor is decreased according to reference power adjustment $\Delta$ described in TS 25 214 [5]			
NOTE 4: For any given tra be transmitted co	: 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 CQI tables accor	5: The UE shall be configured in non-64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.1BC.1: Test Parameters for CQI test in AWGN - single link

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 and 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.
- 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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 CQI reports. 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 )  $\geq 0.1$ 

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.

Parameter	Unit	Test 1	Test 2	
$HS\text{-}PDSCHE_c/I_{or}$	dB	-8	-4	
$\hat{I}_{or}$ / $I_{oc}$	dB	0	5	
I <sub>oc</sub>	dBm/3.84 MHz	-6	0	
Phase reference	-	P-CP	ICH	
HS-SCCH_1 $E_c/I_{or}$	dB	-8.	5	
DPCH $E_c / I_{or}$	dB	-6	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	-	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		Cas	e 8	
Note1: Measurement po defined in 25.33 Note2: TF for HS-PDSC based on mediar configured accor	<ul> <li>Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8]</li> <li>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]</li> </ul>			
NOTE 3: HS-PDSCH Ec/lo described in TS	: HS-PDSCH Ec/lor is decreased according to reference power adjustment $\Delta$ described in TS 25.214 [5].			
NOTE 4: For any given tra shall be transmit	: 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 appropriate CQI	The UE shall be configured in non-64QAW non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Fable 9.3.2AB.1: Test Parameters fo	or CQI test in fading	- single link
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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  $\leq 60\%$  and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is  $\leq 15\%$ .

# 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 9.3.2A B.3.
- Set test conditions according to test 1 in table 9.3.2A B.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 9.3.2A B.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  $\leq 60\%$ 

7.5 Timeslots TSO TS1 TS2 TS3 TS4 TS5 TS6 TS7 TS8 TS9 TS10 TS11 TS12 TS13 TS14 TS15 TS16 TS17 HS-PDSCH HS-PDSCH TB n+2 TB n+3 TB n+4 TB n+5 TB n+6 TB n+1 TBn. HS-DPCCH HS-DPCCH CQI AN n-2 CQI k-2 AN n-1 CQI k-1 AN CQI k AN n+1 CQI k+1 AN n+2 CQI k+2 AN n+3 CQI k+3 n-3 n CQI reference period Referenc Reference Reference Refere CQI report k-3 (corresponding to reference period k-3) and period k-3 period period period ACK/NACK message n (corresponding to HS-PDSCH TB n) k-2 k-1 are combined to obtain the BLER

R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER  $\leq 15\%$ 



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.

Parameter	Unit	Test 1	Test 2
$HS ext{-}PDSCHE_c/I_{or}$	dB	-8	-4
$\hat{I}_{or}$ / $I_{oc}$	dB	0	5
I <sub>oc</sub>	dBm/3.84 MHz	-6	0
Phase reference	-	P-CP	ICH
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- frame HS-SCCH-1 shall be "XOOX indicates TTI in whic uses the identity of and "O" indicates T SCCH-1 uses a diff	-TTI=3 the six sub- signalling pattern OO", where "X" the HS-SCCH-1 the UE under test, If in which the HS- ferent UE identity.
Propagation Channel		Cas	e 8
<ul> <li>Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8]</li> <li>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]</li> </ul>			
<ul> <li>NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214 [5].</li> <li>NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH</li> </ul>			
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].			ode and use

Table 9.3.2AC.1: Test Parameters for CQI test in fading	J - single	link
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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  $\leq 60\%$  and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is  $\leq 15\%$ .

# 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 in dicator 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 9.3.2A C.3.
- Set test conditions according to test 1 in table 9.3.2A C. 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 9.3.2A C.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  $\leq 60\%$
- R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3  $BLER \le 15\%$



# 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 $\alpha 1$ and $\alpha 2$ 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  $\alpha_1$ , and  $M_2$  be the median CQI that the UE reports in static propagation conditions, with  $\hat{I}_{or}/I_{oc}$  set to  $\alpha_2$ . 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  $T_{\text{measure}}$  as depicted in Figure 9.3.1C.1, shall be in the range of +/-3 of M1, for the cases when  $T_{\text{measure}}$  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  $T_{\text{measure}}$  occurs during time-periods where  $\hat{I}_{or}/I_{oc}$  is set to  $\alpha_2$ .

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<sub>measure</sub>.

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<sub>measure</sub>.

An illustration of these timing relations is provided in Figure 9.3.1C.2.

Parameter	Unit	Test 1	
α <sub>1</sub>	dB	10	
α <sub>2</sub>	dB	0	
I <sub>oc1</sub>	dBm/3.84 MHz	-60	
I <sub>oc2</sub>	dBm/3.84 MHz	-50	
Phase reference	-	P-CPICH	
T <sub>measure</sub>	TTI	8	
T <sub>delay</sub>	TTI	3	
T <sub>settle</sub>	TTI	1	
T <sub>pulse</sub>	TTI	12	
$HS ext{-}PDSCHE_c/I_{or}$	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 pow in [8] NOTE 2: The UE shall be co	ver offset "Г" is cor onfigured in non-6	figured by RRC accordingly and as defined 4QAM/non-MIMO mode and use appropriate	

#### Table 9.3.1C.1: Test Parameter for CQI test in periodically varying radio conditions - single link



# 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.

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	
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>		
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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 trans mits nothing in its CQI field (CQI0) are counted as CQI reports. The collected CQI pattern would be "...OOOOHHHHHHHHOOOOLLLLLLLLLOOOO...", 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  $\hat{I}_{ar}/I_{cc}$ . Stop when 4000 reports have been gathered.
- 5) Set up a relative frequency distribution for the collected CQI-values, belonging to the I<sub>oc1</sub> 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<sub>1</sub>.

- 6) Set up a relative frequency distribution for the collected CQI-values, belonging to the I<sub>oc2</sub> 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<sub>2</sub>.
- 7) If 1800 or more of the collected CQI values, reported for  $I_{oc1}$ , are in the range (Median CQI  $M_1 3$ )  $\leq$  Median CQI  $\leq$  (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)  $\leq$  Median CQI  $\leq$  (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.

Parameter		Unit	Test 1	Test 2
HS-P	$DSCHE_c/I_{or}$	dB	-8	-4
	$\hat{I}_{or} / I_{oc}$	dB	0	5
	I <sub>oc</sub>	dBm/3.84 MHz	-60	
Phas	se reference	-	P-CPICH	
HS-SC	CCH_1 $E_c/I_{or}$	dB	-8.5	
DP	CH $E_c / I_{or}$	dB	-6	i
Maxim H-ARC	um number of transmission	-	1	
Number to be	of HS-SCCH set e monitored	-	1	
CQI fe	edback cycle	ms	2	
CQI re	petition factor	-	1	
HS-SCCH-1 signalling pattern		-	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.	
Propag	pation Channel		Case 8	
Note1: Note2:	Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8] TF for HS-PDSCH is configured according to the reported CQI statistics. TF based on median CQI is used. Other physical channel parameters are			
NOTE 3:	HS-PDSCH Ec/lor is decreased according to reference power adjustment $\Delta$ 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- 64QAWnon-MIMO mode and use appropriate CQI tables according to TS 25.214.			

Table 9.3.2.1: Test Parameters for CQI test in fading - single link

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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

# 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

Release 11

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.

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
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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 F	PDU size of 112 is used. For other UE
categories, MAC-d PDU sizes of 112 and 44	48 are used. Less than CQI value of 23
according to [5], 112 is used, and above the	CQI values, 448 is used.

Table 9.3.2.3 Contents of RADIO BEARER SETUP message:	AM or UN	M (HSDPA)

- 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 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  $BLER \le 60\%$ 



#### R2: HSDPA block with corresponding reported CQI = Median CQI + 3 $BLER \le 15\%$



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.

Parameter	Unit	Test 1	Test 2	
$HS ext{-}PDSCHE_c/I_{or}$	dB	-8	-4	
$\hat{I}_{or}/I_{oc}$	dB	0	5	
I <sub>oc</sub>	dBm/3.84 MHz	-6	0	
Phase reference	-	P-CP	ICH	
HS-SCCH_1 $E_c / I_{or}$	dB	-8.	5	
DPCH $E_c / I_{or}$	dB	-6	5	
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	-	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		Cas	e 8	
Note1: Measurement pow defined in 25.331 Note2: TF for HS-PDSCH based on median configured accord	Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8] 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/lo described in TS 2 NOTE 4: For any given tran shall be transmitte	<ul> <li>3: HS-PDSCH Ec/lor is decreased according to reference power adjustment A described in TS 25.214 [5].</li> <li>4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.</li> </ul>			
NOTE 5: The UE shall be c appropriate CQI ta	The UE shall be configured in non-64QAW non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2A.1:	<b>Test Parameters</b>	for CQI tes	st in fadino	ı - sinale	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  $\leq 60\%$  and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is  $\leq 15\%$ .

# 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	

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	
- Measurement Feedback Info		
- CHOICE mode	FDD	
- Measurement Power Offset	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	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning	Explicit	
- Process Memory Size	The value of NiR of CQI table specified	
	according to TS 25.214 [5] clause 6A.2.3	
- Process Memory Size	The value of NiR 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	

Contents of RADIO BEARER SETUP message: AM or UM (DC-HSDPA)

- 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  $\leq 60\%$
- R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3 BLER  $\leq 15\%$



# 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.

Parameter	Unit	Test 1	Test 2	
$HS\operatorname{-PDSCH}E_c/I_{or}$	dB	-8	-4	
$\hat{I}_{or}$ / $I_{oc}$	dB	0	5	
I <sub>oc</sub>	dBm/3.84 MHz	-6	0	
Phase reference	-	P-CP	ICH	
HS-SCCH_1 $E_c/I_{or}$	dB	-8.	5	
DPCH $E_c / I_{or}$	dB	-6	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	-	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 po defined in 25.331 Note2: TF for HS-PDSCI based on median configured accorr	<ul> <li>Measurement power offset "Γ" is configured by RRC accordingly and as defined in 25.331 [8]</li> <li>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]</li> </ul>			
NOTE 3: HS-PDSCH Ec/lo described in TS 2	HS-PDSCH Ec/lor is decreased according to reference power adjustment $\Delta$ described in TS 25.214 [5].			
NOTE 4: For any given transhall be transmitt	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 appropriate CQI	The UE shall be configured in non-64QAW non-MIMO mode and use appropriate CQI tables according to TS 25.214 [5].			

Table 9.3.2AA.1: Test Parameters 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  $\leq 60\%$  and that the BLER for blocks associated with composite CQI reports of cell specific Median CQI+3 is  $\leq 15\%$ .

# 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	FDD	
- DL Scrambling Code		
- HS-SCCH Channelisation Code Info		
- HS-SCCH Channelisation Code	2	
- Measurement Feedback Info		
- CHOICE mode	FDD	
- Measurement Power Offset	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	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
- CHOICE Memory Partitioning	Explicit	
- Process Memory Size	The value of Nir of CQI table specified	
	according to TS 25.214 [5] clause 6A.2.3	
- Process Memory Size	The value of Nir 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 B LER  $\leq 60\%$
- R2: HSDPA block with corresponding reported cell specific CQI = cell specific Median CQI + 3  $BLER \le 15\%$



# 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.

Parameter	Unit	Test 1	
$HS ext{-}PDSCHE_c/I_{or}$	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	
<ul> <li>NOTE 1: Measurement power offset "Г" is configured by RRC accordingly and as defined in [8].</li> <li>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 to the CQI meaning to the data TEOPE 214.</li> </ul>			
NOTE 3: HS-PDSCH Ec/lo described in TS 2 NOTE 4: For any given tran	<ul> <li>3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214</li> <li>4: For any given transport format the power of the HS-SCCH and HS-PDSCH</li> </ul>		
shall be transmitte NOTE 5: The UE shall be c appropriate CQI ta	<ul> <li>shall be transmitted continuously with constant power.</li> <li>5: The UE shall be configured in 64QAM/non-MIMO mode and use appropriate CQI tables according to TS 25.214.</li> </ul>		

#### Table 9.3.2B.1: Test Parameters for CQI test in fading, 64QAM - single link

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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

# 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		
<ul> <li>Downlink DPCH info for each RL</li> </ul>		
- 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	1		
- 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			
<ul> <li>CHOICE DL MAC header type</li> </ul>	MAC-ehs	Rel-7		
<ul> <li>Added or reconfigured MAC-ehs reordering</li> </ul>		Rel-7		
queue				
<ul> <li>MAC-ehs queue to add or reconfigure list</li> </ul>	(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 val	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 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  $\leq 60\%$ 





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  $\pm -2$  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.

P	arameter	Unit	Test 1	Test 2	Test 3
	$\hat{I}_{or}$ / $I_{oc}$	dB	0	5	10
	I <sub>oc</sub>	dBm/3.84 MHz		-60	
Phas	se reference	-		P-CPICH	
HS-P	$DSCHE_c/I_{or}$	dB		-3	
HS-S0	CCH_1 $E_c / I_{or}$	dB		-10	
DP	PCH $E_c / I_{or}$	dB		-10	
Maxim H-ARC	um number of ຊ transmission	-		1	
Number to b	of HS-SCCH set e monitored	-	1		
CQI fe	edback cycle	ms		2	
CQI re	epetition factor	-		1	
HS-SC	CH-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 pov in [8].	ver offset "Г" is cor	figured by RF	RC accordingly a	nd as defined
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/lor is decreased according to reference power adjustment $\Delta$ 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-64QAWnon-MIMO mode and use appropriate				

Table 9.3.3.1: Test Parameters for CQI test in AWGN - single link

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)  $\leq$  Median CQI  $\leq$  (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 go to step 7), otherwise go to step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $(NACK / ACK + NACK) \ge 0.1$ 

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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

# SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1

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

#### 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
<ul> <li>Measurement Feedback Info</li> </ul>	
- CHOICE mode	FDD
- POhsdsch	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	HS-DSCH
- HARQ Info	
- Number of Processes	2
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	STTD
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	1
NOTE 1: For UE Categories 1-6, 11 and 12, MAC-d PDL	I 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.

Parameter	Unit	Test 1	Test 2
$HS\operatorname{-PDSCH}E_c/I_{or}$	dB	-8	-4
$\hat{I}_{or} / I_{oc}$	dB	0	5
$I_{oc}$	dBm/3.84 MHz	-6	0
Phase reference	-	P-CP	ICH
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- frame HS-SCCH-1 shall be "XOOX( indicates TTI in whic uses the identity of 1 and "O" indicates TT SCCH-1 uses a diff	-TTI=3 the six sub- signalling pattern DO", where "X" the HS-SCCH-1 the UE under test, If in which the HS- ferent UE identity.
Propagation Channel	jation Channel Case 8		
<ul> <li>Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]</li> <li>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</li> </ul>			
<ul> <li>NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214.</li> <li>NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH</li> </ul>			
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.			ode and use

#### Table 9.3.4.1: Test Parameters for CQI test in fading - single link

Table 9.3.4.2: Minimum requirement for CQI test in fading - single link

Reported CQI	Maximu	Im 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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

#### 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  $\leq 60\%$ 

R2: HSDPA block with corresponding reported CQI = Median CQI + 3  $BLER \le 15\%$ 



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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1

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

#### 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 9.3.4.1 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
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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
Downlink information common for all radio links	
- CHOICE mode	FDD
- TX Diversity Mode	STTD
Downlink DPCH info for each RL	
- CHOICE mode	FDD
- Downlink DPCH info for each RL	
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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  $\pm$ -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 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.

P	arameter	Unit	Test 1	Test 2	Test 3
$\hat{I}$ / I		dB	0	5	10
I or / I oc					
I <sub>oc</sub>				-60	
Phas	se reference	-	P-CPICH		
HS-P	$DSCHE_c/I_{or}$	dB		-3	
HS-SC	CCH_1 $E_c / I_{or}$	dB		-10	
DP	CH $E_c / I_{or}$	dB		-10	
Maxim H-ARC	um number of Q transmission	-		1	
Number to b	of HS-SCCH set e monitored	-		1	
CQI fe	edback cycle	ms		2	
CQI re	petition factor	-		1	
Feedb	ack Error Rate	%	0		
Closed loop timing adjustment mode				1	
HS-SCCH-1 signalling pattern		-	To incorpora HS-SCCH "XOOXOO which the H the UE undo which the H	te inter-TTI=3 th I-1 signalling pat D", where "X" in IS-SCCH-1 uses er test, and "O" in S-SCCH-1 uses identity.	e six sub-frame tern shall be ndicates TTI in the identity of ndicates TTI in a different UE
Note1:	te1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8].			nd as defined	
Note2: TF for HS-PDSCH is configured according to the reported CQI s based on median CQI, median CQI -1, median CQI+2 are used channel parameters are configured according to the CQI mappin described in TS25.214		eported CQI sta QI+2 are used. C ne CQI mapping	tistics. TF )ther physical table		
NOTE 3:	TE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214.			ustment∆	
NOTE 4:	E 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.			-PDSCH shall	
NOTE 5: The UE shall be configured in non-64QAW/non-MIMO mode and use appropr CQI tables according to TS 25.214.			se appropriate		

Table 9.3.5.1: Test Parameters for CQI test in AWGN - single link

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+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.
- 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)  $\leq$  Median CQI  $\leq$  (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 go to step 7), otherwise go to step 8)

7) The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $(NACK / ACK + NACK) \ge 0.1$ 

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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

# RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1

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

#### 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	
<ul> <li>Measurement Feedback Info</li> </ul>		
- CHOICE mode	FDD	
- POhsdsch	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	HS-DSCH	
- HARQ Info		
- Number of Processes	2	
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>		
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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	
CHOICE channel requirement	Uplink DPCH info	
- Number of FBI bit	1	
Downlink information common for all radio links		
- CHOICE mode	FDD	
- TX Diversity Mode	Closed loop mode1	
Downlink DPCH info for each RL		
- CHOICE mode	FDD	
- Downlink DPCH info for each RL		
<ul> <li>Closed loop timing adjustment mode</li> </ul>	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.

Parameter		Unit	Test 1	Test 2
HS-PDSCH $E_c / I_c$	r	dB	-8	-4
$\hat{I}_{or} / I_{oc}$		dB	0	5
I <sub>oc</sub>		dBm/3.84 MHz	-60	
Phase reference		-	P-CPICH	
HS-SCCH_1 $E_c/R$	or	dB	-8.5	
DPCH $E_c / I_{or}$		dB	-6	6
Maximum number H-ARQ transmissi	of on	-	1	
Number of HS-SCCI	Iset	-	1	
to be monitored	0			
	or	-	2	
Feedback Error Ra	ate	%	0	
Closed loop timing adjustment mode			1	
HS-SCCH-1 signalling pattern		-	To incorporate inter frame HS-SCCH-1 shall be "XOOX indicates TTI in whic uses the identity of and "O" indicates T SCCH-1 uses a dif	-TTI=3 the six sub- signalling pattern OO", where "X" ch the HS-SCCH-1 the UE under test, II in which the HS- ferent UE identity.
Propagation Channel			Cas	e 8
<ul> <li>Note1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]</li> <li>Note2: TF for HS-PDSCH is configured according to the reported CQI statistics. TF</li> </ul>				
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/lor is decreased according to reference power adjustment Δ				
described NOTE 4: For any giv shall be tra	described in 1S 25.214. TE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.			
appropriate CQI tables according to TS 25.214.				

#### Table 9.3.6.1: Test Parameters for CQI test in fading - single link

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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

## 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.
- 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  $\leq 60\%$
- R2: HSDPA block with corresponding reported CQI = Median CQI + 3  $BLER \le 15\%$



#### 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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

## SYSTEM INFORMATION BLOCK TYPE11

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

# RRC CONNECTION SETUP

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

### RADIO BEARER SETUP for Closed test loop mode1

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

#### 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 9.3.6.1 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	
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>		
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	(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	
- MAC-d PDU size index	1	
CHOICE channel requirement	Uplink DPCH info	
- Number of FBI bit	1	
Downlink information common for all radio links		
- CHOICE mode	FDD	
- TX Diversity Mode	Closed loop mode1	
Downlink DPCH info for each RL		
- CHOICE mode	FDD	
- Downlink DPCH info for each RL		
- Closed loop timing adjustment mode	1	
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.

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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. The BLER at 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.

	Parameter	Unit	Test 1
H	S-PDSCH $E_c / I_{or}$	dB	-2
	$\hat{I}_{or}$ / $I_{oc}$	dB	6
	I <sub>oc</sub>	dBm/3.84 MHz	-60
F	Phase reference	-	P-CPICH (E.5.2)
HS	S-SCCH_1 $E_c/I_{or}$	dB	-15 (using STTD)
	DPCH $E_c / I_{or}$	dB	-10 (using STTD)
Precodir	ng weightset restriction	-	Disabled
Ma H-/	ximum number of ARQ transmission	-	1
Numbei	r of HS-SCCH set to be monitored	-	1
CO	QI feedback cycle	ms	2
CC	QI repetition factor	-	1
PCI/CC	ହା reporting Error Rate	%	0
HS-SC	CH-1 signalling pattern	-	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.
Pro	pagation Channel		MIMO single stream fading conditions
<ul> <li>NOTE 1: Measurement power offset "I" is configured by RRC accordingly and as defined in [8]</li> <li>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.</li> </ul>			
NOTE 3:	NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment ∆ described in TS 25.214		
NOTE 4:	E 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.		
NOTE 5:	NOTE 5: The UE shall be configured in non-64QAW/MIMO mode and use appropriate CQI tables according to TS 25.214.		

Table 9.3.7A.1: Test Parameters for CQI test in MIMO single stream fading conditions

Benerted COI	Maximum BLER
Reported Col	Test 1
CQI median	60%
CQI median + 3	15%

#### Table 9.3.7A.2: Minimum requirement for CQI test in MIMO single stream conditions

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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

## 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.

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In the test there are two BLER requirements to be tested:

R1: HSDPA block with corresponding reported CQI = Median CQI  $BLER \le 60\%$ 

R2: HSDPA block with corresponding reported CQI = Median CQI + 3 BLER  $\leq 15\%$ 



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	Start
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/2
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	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 COIs for each stream when transmitting a fixed transport format per stream given by the stream specific COI 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 embed ded 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 COI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same CQI values were associated.

Parameter	Unit	Test 1	
$HS\text{-}PDSCHE_c/I_{or}$	dB	-2	
$\hat{I}_{or}/I_{oc}$	dB	10	
I <sub>oc</sub>	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		1	
H-ARQ transmission	-	Ι	
Number of HS-SCCH set to be	_	1	
monitored	-	I	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
PCI/CQI reporting Error Rate	%	0	
HS-SCCH-1 signalling pattern	-	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/lor is decreased according to reference power adjustment ∆ described in TS 25.214			
NOTE 4: For any given transport fo transmitted continuously w	rmat the power of th vith constant power	ne HS-SCCH and HS-PDSCH shall be	
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.1: Test Parameters for CQI test in MIMO dual stream fading conditions

#### 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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

## 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<sub>1</sub> and CQI<sub>2</sub> 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<sub>1</sub> and CQI<sub>2</sub> shall be used column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> 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 trans mit 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 CQIBLER  $\leq 60\%$ R2: HSDPA block with corresponding reported CQI = Median CQI + 3BLER  $\leq 15\%$ 



#### 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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 COI values were associated.

Parameter	Unit	Test 1	
$HS ext{-}PDSCHE_c/I_{or}$	dB	-2	
$\hat{I}_{or} / I_{oc}$	dB	10	
I <sub>oc</sub>	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 weightset 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	-	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	
<ul> <li>NOTE 1: Measurement power offset "\Gamma" is configured by RRC accordingly and as defined in [8]</li> <li>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 subdause 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 subdause D.2.6.2</li> </ul>			
NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214			
NOTE 4: For any given tran shall be transmitte	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.1: Test Parameters for CQI test in MIMO dual stream fading conditions

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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+2 is  $\leq 15\%$ .

## 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<sub>1</sub> and CQI<sub>2</sub> 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<sub>1</sub> and CQI<sub>2</sub> shall be used column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> shall be used for stream#1 and stream #2 as depicted in Figure D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> 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 trans mit 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  $BLER \le 60\%$ 

R2: HSDPA block with corresponding reported CQI = Median CQI + 2  $BLER \le 15\%$ 





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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	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  $^{W}$  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.

Parameter	Unit	Test 1
$HS\text{-}PDSCHE_c/I_{or}$	dB	-2
$\hat{I}_{or}$ / $I_{oc}$	dB	10
I <sub>oc</sub>	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 <sub>c</sub> / I <sub>or</sub>	dB	-10(using STTD)
Precoding weight set	-	Disabled
restriction		2.000.000
Maximum number of	-	1
H-ARQ transmission		
Number of HS-SCCH set to	-	1
	Me	2
COI repetition factor	1015	1
PCI/COI reporting Error	_	1
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 " $\Gamma$ " is configured by RRC accordingly and as		
defined in [8] NOTE 2: HS-PDSCH Ec/lor 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		
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+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)  $\leq$  Median CQI  $\leq$  (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 go to step 6), otherwise go to step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $) \ge 0.1$ 

then pass the UE, otherwise fail the UE

 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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 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.

Parameter	Unit	Test 1	
$HS ext{-}PDSCHE_c/I_{or}$	dB	-2	
$\hat{I}_{or}$ / $I_{oc}$	dB	15	
I <sub>oc</sub>	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 weightset 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 s frame HS-SCCH-1 signalling pattern shall be "XOOXOO", where "X" - indicates TTI in which the HS-SCCH uses the identity of the UE under ter and "O" indicates TTI in which the H 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/IOF 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 64QAWMIMO mode and use appropriate CQI tables according to TS 25.214.			

#### Table 9.3.7E.1: Test Parameters for CQI test in MIMO dual stream static orthogonal

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+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 go to step 6), otherwise go to step 7)

6. The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $) \ge 0.1$ 

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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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. The BLER at a particular composed 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 the precoding vector embedded in the propagation channel as defined in subclause D.2.9.1. The BLER at a particular 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.

Parameter	Unit	Test 1	
HS-PDSCH $E_c / I_{or}$	dB	-2.23	
$\hat{I}_{or} / I_{oc}$	dB	6	
I <sub>oc</sub>	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	_	1	
monitored	_	1	
CQI feedback cycle	ms	2	
CQI repetition factor	-	1	
PCI/CQI reporting Error Rate	%	0	
HS-SCCH-1 signalling pattern	-	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 condit		MIMO single stream fading conditions	
<ul> <li>NOTE 1: Measurement power offset "Γ" is configured by RRC accordingly and as defined in [8]</li> <li>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 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.</li> </ul>			
NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214			
<ul> <li>NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted continuously with constant power.</li> <li>NOTE 5: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables according to TS 25 214</li> </ul>			

## Table 9.3.7F.1: Test Parameters for CQI test in MIMO single stream fading conditions

Table 9.3.7F.2: Minimum	n requirement fo	r CQI test in MIMO	single stream	conditions
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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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

### 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	$BLER \le 60\%$
R2: HSDPA block with corresponding reported $CQI = Median CQI + 3$	BLER $\leq 15\%$





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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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 me dian 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  $COI_1$  and  $COI_2$  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 COI values were associated.
Parameter		Unit	Test 1
$HS\text{-}PDSCHE_c/I_{or}$		dB	-2.23
$\hat{I}_{or} / I_{oc}$		dB	10
I <sub>oc</sub>		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 weightset rest	riction	-	Enabled
Maximum number o H-ARQ transmissior	f า	-	1
Number of HS-SCCH set	to be	_	1
monitored		-	I
CQI feedback cycle		ms	2
CQI repetition factor	r D	-	1
PCI/CQI reporting Error	Rate	%	
HS-SCCH-1 signalling pa	attern	-	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 Channe	el		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 attransmemory in subclause D.2.9.2			
NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214			
NOTE 4: For any given trans continuously with co	NOTE 4: For any given transport format the power of the HS-SCCH and HS-PDSCH shall be transmitted		
NOTE 5:: The UE shall be configured in non-64QAM/MIMO mode and use appropriate CQI tables			

#### Table 9.3.7G.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Table 9.3.7G.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Bonortod COI	Maximum BLER
Reported Col	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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+3 is  $\leq 15\%$ .

#### 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<sub>1</sub> and CQI<sub>2</sub> 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<sub>1</sub> and CQI<sub>2</sub> shall be used column of the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> shall be used to determine the median CQI values for stream#1 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 trans mit 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	$BLER \le 60\%$

R2: HSDPA block with corresponding reported CQI = Median CQI + 3  $BLER \le 15\%$ 





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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
<ul> <li>Precoding weight set restriction</li> </ul>	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 min imum 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 COI median as shown in Table 9.3.7H.2. The stream specific COI median shall be determined over all dual transport block COI 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 COI reference measurement period and calculating the fractions of erroneous HS-PDSCH subframes to which the same COI values were associated.

Parameter	Unit	Test 1
$HS ext{-}PDSCHE_c/I_{or}$	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	10
I <sub>oc</sub>	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 weightset 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	-	Io incorporate inter-III=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
<ul> <li>NOTE 1: Measurement power offset "Г" is configured by RRC accordingly and as defined in [8]</li> <li>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 matrix for dual transport block transmission out of the set of possible precoding matrix solution for the 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 MMO dual stream conditions in subclause D.2.6.2</li> </ul>		
NOTE 3: HS-PDSCH Ec/lor is decreased according to reference power adjustment Δ described in TS 25.214		
NOTE 4: For any given tran	sport format the po	ower of the HS-SCCH and HS-PDSCH
NOTE 5: The UE shall be configured in 64QAW/MIMO mode and use appropriate CQI tables according to TS 25.214.		

#### Table 9.3.7H.1: Test Parameters for CQI test in MIMO dual stream fading conditions

Table 9.3.7H.2: Minimum requirement for CQI test in MIMO dual stream fading conditions

Reported COI	Maximum BLER
Reported Odi	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  $\leq 60\%$  and that the BLER for blocks associated with CQI reports of Median CQI+2 is  $\leq 15\%$ .

#### 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<sub>1</sub> and CQI<sub>2</sub> 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<sub>1</sub> and CQI<sub>2</sub> shall be used for stream #1 and stream #2 as depicted in Figure D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> shall be used for the precoding matrix embedded in the propagation channel as defined in subclause D.2.9.2, the reported values CQI<sub>1</sub> and CQI<sub>2</sub> 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 trans mit 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  $BLER \le 60\%$ 

R2: HSDPA block with corresponding reported CQI = Median CQI + 2  $BLER \le 15\%$ 





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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
<ul> <li>Precoding weight set restriction</li> </ul>	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.

# 9.3.71 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 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.

Parameter	Unit	Test 1
$HS\text{-}PDSCHE_c/I_{or}$	dB	-2.23
$\hat{I}_{or} / I_{oc}$	dB	10
I <sub>oc</sub>	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 weightset 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/lor 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.		

Table 9.3.7I.1: Test Parameters for CQI test in MIMO dual stream static orthogonal cond
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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+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 CQI reports. 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 )  $\geq 0.1$ 

then pass the UE, otherwise fail the UE

 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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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 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.

Parameter	Unit	Test 1
$HS ext{-}PDSCHE_c/I_{or}$	dB	-2.23
$\hat{I}_{or}$ / $I_{oc}$	dB	15
I <sub>oc</sub>	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 weightset 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/lor 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.		

#### Table 9.3.7J.1: Test Parameters for CQI test in MIMO dual stream static orthogonal

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+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)  $\leq$  Median CQI  $\leq$  (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 go to step 6), otherwise go to step 7)

 The SS shall transmit the TF according to the median-CQI+2 value and shall not react to the UE's CQI reports. 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  $) \ge 0.1$ 

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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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  $P(E_m)$ .

Parameter	Unit	Test 1	Test 2	Test 3
I <sub>oc</sub>	dBm/3.84 MHz		-60	
Phase reference	-		P-CPICH	
P-CPICH $E_c / I_{or}$	dB		-10	
HS-SCCH UE Identity		HS-SCC	H-1: 101010101	0101010
$(x_{ue1}, x_{ue2},, x_{ue16})$		(every thir	rd TTI only, UE ι	inder test
· <i>uc</i> ,1 <i>uc</i> ,2 <i>uc</i> ,10 ·		addresse	d solely via HS-	SCCH-1)
		HS-SCC	H-2: 000100101	0101010
		HS-SCC	H-3: 000110101	0101010
		HS-SCC	H-4: 000111111	0101010
HS-DSCH TF of UE1		TF corresponding to CQI1		
HS-SCCH-1 transmission pattern		The HS-SCCH-1 shall be transmitted		
		continuously w	ith constant pow	/er.
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted		
		continuous ly w	ith constant pow	/er.
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-fra	me HS-SCCH-1	signalling
		pattern shall be	e "XOOXOO	", where "X"
		indicates TTI in	which the HS-S	SCCH-1 us es
		the identity of the	ne UE under tes	t, and "O"
		indicates TTI in	which the HS-S	SCCH-1 uses a
		different UE ide	entity.	

Table 9.4.1.1: Test parameters for HS-SCCH detection - single link

Test	Propagation	Reference value		
Number	Conditions	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

#### Table 9.4.1.2: Minimum requirement for HS-SCCH detection - single link

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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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.

Parameter	Unit	Test 1	Test 2	Test 3
I <sub>oc</sub>	dBm/3.84 MHz		-60	
Phase reference	-		P-CPICH	
P-CPICH $E_c / I_{or}$	dB		-9.9	
HS-SCCH UE Identity		HS-SCC	H-1: 101010101	0101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE under test addressed solely via HS-SCCH-1)		
		HS-SCC HS-SCC HS-SCC	H-3: 000100101 H-3: 000110101 H-4: 000111111	0101010 0101010 0101010
HS-DSCH TF of UE1		TF co	prresponding to	CQI1
MAC-d PDU size	Bits	112		
HS-SCCH-1 transmission pattern		The HS-SCCH continuously w	<ul> <li>-1 shall be trans ith constant pov</li> </ul>	smitted ver.
HS-PDSCH transmission pattern		The HS-PDSC continuously w	H shall be trans ith constant pov	mitted ver.
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-fra pattern shall be indicates TTI in the identity of the indicates TTI in different UE ide	me HS-SCCH- e "XOOXOO which the HS- he UE under tes which the HS- entity.	I signalling .", where "X" SCCH-1 uses st, and "O" SCCH-1 uses a
Number of HARQ processes			2	

#### Table 9.4.1.3: Test parameters for HS-SCCH detection - single link

Table 9.4.1.4: Test requirement for HS-SCCH detection - single link

Test	Propagation	Reference value		
Number	Conditions	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  $E_{\rm mb}$  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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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 <sub>oc</sub>	dBm/3.84 MHz		-60	
Phase reference	-		P-CPICH	
P-CPICH $E_c / I_{or}$	dB		-10	
HS-SCCH UE Identity		HS-SCC	H-1: 101010101	0101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(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		Inder test SCCH-1) 0101010 0101010 0101010
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-frampattern shall be indicates TTI in the identity of the indicates TTI in different UE ide	me HS-SCCH-1 e "XOOXOO which the HS-S ne UE under tes which the HS-S entity.	signalling ", where "X" SCCH-1 uses t, and "O" SCCH-1 uses a

# Table 9.4.1A.2: Minimum requirement for Enhanced performance requirements type 1 for HS -SCCH detection - single link

Test	Propagation		Reference value		
Number	Conditions	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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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.

Parameter	Unit	Test 1	Test 2	Test 3
I <sub>oc</sub>	dBm/3.84 MHz	-60		
Phase reference	-		P-CPICH	
P-CPICH $E_c/I_{or}$	dB		-9.9	
HS-SCCH UE Identity		HS-SCC	H-1: 101010101	0101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every thir addresse	d TTI only, UE ι d solely via HS-	Inder test SCCH-1)
		HS-SCC	H-2: 000100101	0101010
		HS-SCC	H-3: 000110101	0101010
		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 wi	th constant pow	/er.
HS-PDSCH transmission pattern		The HS-PDSCH shall be transmitted		
		continuous ly wi	th constant pow	/er.
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-fra	me HS-SCCH-1	signalling
		pattern shall be	e "XOOXOO	", where "X"
		indicates TTI in	which the HS-S	SCCH-1 uses
		the identity of th	ne UE under tes	t, and "O"
		indicates TTI in	which the HS-S	SCCH-1 uses a
		different UE ide	entity.	
Number of HARQ processes			2	

#### Table 9.4.1A.3: Test parameters for HS-SCCH detection - single link

# Table 9.4.1A.4: Test requirement for Enhanced performance requirements type 1 for HS-SCCH detection - single link

Test	Propagation	Reference value		
Number	Conditions	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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 <sub>oc</sub>	dBm/3.84 MHz		-60	·	
Phase reference	-		P-CPICH		
P-CPICH E <sub>c</sub> / I <sub>or</sub>	dB		-10		
HS-SCCH UE Identity		HS-SCO	CH-1: 10101010101	01010	
$(x \downarrow x \downarrow \ldots x \downarrow \ldots)$		(every third TTI on	ly, UE under test ad	dressed solely via	
<i>ue</i> ,1,7 <i>ue</i> ,2,7 7 <i>ue</i> ,167			HS-SCCH-1)		
		HS-SCCH-2: 0001001010101010			
		HS-SC	CH-3: 00011010101	01010	
		HS-SC	CH-4: 00011111101	01010	
HS-DSCH TF of UE1		TF	corresponding to CO	QI1	
HS-SCCH-1 transmission		The HS-SCCH-1 sh	nall be transmitted of	continuous ly with	
pattern		constant power.			
HS-PDSCH transmission		The HS-PDSCH sh	all be transmitted c	ontinuously with	
pattern		constant power.			
HS-SCCH-1 TTI Signalling	-	The six sub-frame	HS-SCCH-1 signalli	ng pattern shall	
Fallen			, where A multale		
		"O" indicatos TTL in	which the US SCC		
		different LE identit		11-1 USES a	
			/.		

#### Table 9.4.2.2: Minimum requirement for HS-SCCH detection - open loop diversity

Test	Propagation		Reference value	
Number	Conditions	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.

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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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

## 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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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-SC	CCH detection - o	pen loop diversity

Parameter	Unit	Test 1	Test 2	Test 3
I <sub>oc</sub>	dBm/3.84 MHz		-60	
Phase reference	-		P-CPICH	
P-CPICH $E_c / I_{or}$	dB		-9.9	
HS-SCCH UE Identity		HS-SCO	CH-1: 10101010101	01010
$(x_{ue_1}, x_{ue_2},, x_{ue_{16}})$		(every third TTI onl	y, UE under test ad	dressed solely via
neșt neșt neșto			HS-SCCH-1)	
		HS-SCO	CH-2: 00010010101	01010
		HS-SC	CH-3: 00011010101	01010
		HS-SC0	CH-4: 00011111101	01010
HS-DSCH TF of UE1		TF o	corresponding to CO	QI1
MAC-d PDU size	Bits		112	
HS-SCCH-1 transmission		The HS-SCCH-1 sh	all be transmitted o	continuous ly with
pattern		constant power.		
HS-PDSCH transmission		The HS-PDSCH sh	all be transmitted c	ontinuously with
pattern		constant power.		
HS-SCCH-1 TTI Signalling	-	The six sub-frame I	HS-SCCH-1 signalli	ng pattern shall
Pattern		be "XOOXOO"	where "X" indicate	s TTI in which the
		HS-SCCH-1 uses t	ne identity of the UE	under test, and
		"O" indicates TTI in	which the HS-SCC	H-1 uses a
		different UE identity	<i>.</i>	
Number of HARQ processes		-	2	

Table 9.4.2.5: Test requirement for HS-SCCH detection -	open	loop	diversity
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Test	Propagation	Reference value		
Number	Conditions	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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  $P(E_m)$ .

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MHz	-6	50
Phase reference	-	P-CI	PICH
P-CPICH E <sub>c</sub> / I <sub>or</sub>	dB		10
HS-SCCH UE Identity		HS-SCCH-1: 10 <sup>2</sup>	10101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-S0	der test addressed solely via CCH-1)
		HS-SCCH-2: 000	01001010101010
		HS-SCCH-3: 000	01101010101010
		HS-SCCH-4: 000	01111110101010
HS-DSCH TF of UE1		TF correspor	nding to CQI1
HS-SCCH-1 transmission		The HS-SCCH-1 shall be tra	ansmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be train	nsmitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCF be "XOOXOO", where " HS-SCCH-1 uses the identit "O" indicates TTI in which th	H-1 signalling pattern shall X" indicates TTI in which the y of the UE under test, and e HS-SCCH-1 uses a
		different UE identity.	

 Table 9.4.2A.1: Test parameters for HS-SCCH detection - open loop diversity

# Table 9.4.2A.2: Minimum requirement for Enhanced performance requirements type 1 for HS -SCCH detection - open loop diversity

Test	Propagation	Reference value		
Number	Conditions	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	TRUE
- Secondary CCPCH info	
- STTD Indicator	TRUE
Primary CCPCH info	
- CHOICE mode	FDD
- TX Diversity indicator	TRUE

#### SYSTEM INFORMATION BLOCK TYPE11

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

#### RRC CONNECTION SETUP

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

#### RADIO BEARER SETUP for Closed test loop mode1 and HSDPA

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

# 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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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 <sub>oc</sub>	dBm/3.84 MHz	-60	0
Phase reference	-	P-CP	ICH
P-CPICH E <sub>c</sub> /I <sub>or</sub>	dB	-9.	9
HS-SCCH UE Identity		HS-SCCH-1: 1010	0101010101010
$(x_{ue1}, x_{ue2}, \dots, x_{ue16})$		(every third TTI only, UE und	er test addressed solely via
<i>ue</i> ,1 <i>ue</i> ,2 <i>ue</i> ,10		HS-SC	CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4:000	1111110101010
HS-DSCH TF of UE1		TF correspond	ding to CQI1
MAC-d PDU size	Bits	11:	2
HS-SCCH-1 transmission		The HS-SCCH-1 shall be tran	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be trans	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH	-1 signalling pattern shall
Pattern		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	Propagation					
Number	Conditions	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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. Min imum performance requirements specified in Table 9.4.3.2 and 9.4.3.3 are based on receiver diversity.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz		-6	0	
HS-SCCH UE Identity ( $x_{ue,1}$ , $x_{ue,2}$ ,, $x_{ue,16}$ )		HS-SCCH-1: 10101010101010 (every third TTI only, UE under test addressed solely via HS-SCCH-1) HS-SCCH-2: 00010010101010			0 sed solely via 0
		HS HS	S-SCCH-3: 000 S-SCCH-4: 000	11010101010101 111111010101	0 0
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			
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 9.4.3.1: Tes	parameters for	HS-SCCH Type	e 3 detection
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# 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	Propagation	Reference value				
Number	Conditions	HS-SCCH-1 $E_c / I_{or}$ (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	Propagation	Reference value				
Number	Conditions	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
I <sub>oc</sub>	dBm/3.84 MHz		-6	0	
HS-SCCH UE Identity		HS	-SCCH-1: 101	01010101010101	0
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TT	l only, UE und HS-SC	er test address CH-1)	sed solely via
		HS	-SCCH-2:000	10010101010101	0
		HS	-SCCH-3: 000	110101010101	0
		HS	S-SCCH-4: 000	111111010101	0
HS-DSCH TF of UE1		In case one t	ransport block	is signalled on	HS-SCCH:
		One transpo	ort block with T	Fcorrespondir	ng to CQI1
		Precoding v	ector applied t	o HS-PDSCH	shall cycle
		thr	ough the four p	ossible options	S.
		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		The HS-SCCH-1 shall be transmitted continuously with			
pattern		constant power.			
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with			
pattern		constant power.			
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall			
Pattern		be "XOOXO	O…", where "X	" indicates TTI	in which the
		HS-SCCH-1 us	ses the identity	of the UE und	er test, and
		"O" indicates T	TI in which the	HS-SCCH-1ι	uses a
		different UE id	entity.		

Table 9.4.3.5: Test	parameters for HS-SC	CH Type 3 detection
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# 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	Propagation	Reference value				
Number	Conditions	HS-SCCH-1 $E_c/I_{or}$ (dB) $\hat{I}_{or}/I_{oc}$ (dB) $P(H)$				
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	Propagation	Reference value				
Number	Conditions	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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.3 are based on receiver diversity.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
I <sub>oc</sub>	dBm/3.84 MHz		-6	0		
HS-SCCH UE Identity		HS-SCCH-1: 1	01010101010	1010		
$(x_{1}, x_{2}, \dots, x_{n})$		(every third TT	I only, UE und	er test address	ed solely via	
( ue,1 / ue,2 / ) ue,16 /		HS-SCCH-1)				
		HS-SCCH-2: 0	00100101010	1010		
		HS-SCCH-3: 0	00110101010	1010		
		HS-SCCH-4: 0	00111111010	1010		
HS-DSCH TF of UE1		In case one tra	ansport block is	signalled on H	IS-SCCH:	
		One transport	block with TF c	orresponding	io CQI1	
		Precoding vec	tor applied to ⊦	IS-PDSCH sha	ill 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 or	ly one transpo	rt block.		
		Precoding mat	rix applied to F	IS-PDSCH sha	ill cycle	
		through the for	ur possible opti	ons.		
HS-SCCH-1 transmission		The HS-SCCF	I-1 shall be trai	nsmitted contin	uously with	
pattern		constant powe	r.			
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with				
pattern		constant power.				
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall				
Pattern		be "XOOXO	O…", where "X	" indicates TTI	in which the	
		HS-SCCH-1 u	ses the identity	of the UE und	er test, and	
		"O" indicates T	TI in which the	HS-SCCH-1 ι	uses a	
		different UE id	entity.			

Table 9.4.3A.1: Test parameters for HS-SCCH Type 3 detect
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# 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	Propagation	Reference value				
Number	Conditions	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	Propagation	Reference value				
Number	Conditions	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 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.

#### 9.4.3A.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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/1
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna1 S-CPICH	
>> Channelisation code	13
>> Power Offset for S-CPICH for MIMO	-3
Precoding weightset 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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
I <sub>oc</sub>	dBm/3.84 MHz		-6	0		
HS-SCCH UE Identity		HS-SCCH-1:1	01010101010	1010		
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TT HS-SCCH-1)	I only, UE und	er test address	ed solely via	
		HS-SCCH-2: 0	0010010101010	1010		
		HS-SCCH-3: C	00110101010	1010		
		HS-SCCH-4: 0	000111111010	1010		
HS-DSCH TF of UE1		In case one tra	ansport block is	signalled on H	IS-SCCH:	
		One transport	block with TF o	orresponding	to CQI1	
		Precoding vec	tor applied to ⊦	IS-PDSCH sha	all cycle	
		through the for	ur possible opti	ons.		
		In case two transport blocks are signalled on HS-SCCH:				
		Two transport	blocks with the	same size and	dsame	
		number of OVS	SF codes as us	ed in the case	of	
		transmitting or	ly one transpo	rt block.		
		Precoding mat	trix applied to F	IS-PDSCH sha	all cycle	
		through the for	ur possible opti	ons.		
HS-SCCH-1 transmission		The HS-SCCF	I-1 shall be trai	nsmitted contin	uously with	
pattern		constant powe	r.			
HS-PDSCH transmission		The HS-PDSC	H shall be tran	smitted continu	Jously with	
pattern		constant powe	r.			
HS-SCCH-1 TTI Signalling	-	The six sub-fra	me HS-SCCH	-1 signalling pa	atternshall	
Pattern		be "XOOXO	O", where "X	indicates III	in which the	
		HS-SCCH-1 u	ses the identity	of the UE und	er test, and	
		U indicates I	i i in which the	HS-SCCH-1 (	uses a	
		different UE id	entity.			

Table 9.4.3A.5: Test	parameters for H	HS-SCCH Type	3 detection
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# 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	Propagation	Reference value				
Number	Conditions	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	Propagation	Reference value				
Number	Conditions	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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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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.3 are based on receiver diversity.

Parameter	Unit	Test 1	Test 2	Test 3	Test 4	
I <sub>oc</sub>	dBm/3.84 MH 7		-6	0		
HS-SCCH LIE Identity	11112	HS-SCCH-1 1	01010101010	1010		
		(every third TT		ar tast address	ed solely via	
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$			i only, o' und		eu solery via	
		HS-SCCH-2·0	0010010101010	1010		
		HS-SCCH-3-0	00100101010	1010		
		HS-SCCH-4:0	001111111010	1010		
HS-DSCH TE of LIE1		In case one tra	ans port block is		19-900H·	
		One transport	block with TF of	corresponding t	to COI1	
		Precoding vect	tor applied to H	IS-PDSCH sha	all cycle	
		through the for	ir possible opt	ions		
		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 cvcle				
		through the for	ur possible opt	ions.	,	
HS-SCCH-1 transmission		The HS-SCC⊢	I-1 shall be trai	nsmitted contin	uously with	
pattern		constant power.				
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with				
pattern		constant power.				
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall				
Pattern		be "XOOXOO", where "X" indicates TTI in which the				
		HS-SCCH-1 us	ses the identity	of the UE und	er test, and	
		"O" indicates T	TI in which the	eHS-SCCH-1ι	uses a	
		different UE id	entity.			

Table 9.4.3B.1: Test parameters for HS-SCCH Type 3 detection

# 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	Propagation	Reference value				
Number	Conditions	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	Propagation			
Number	Conditions	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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 <sub>oc</sub>	dBm/3.84 MH z	-60			
HS-SCCH UE Identity		HS-SCCH-1: 1	01010101010	1010	
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TT HS-SCCH-1)	I only, UE und	er test address	ed solely via
		HS-SCCH-2:0	0010010101010	1010	
		HS-SCCH-3: 0	000110101010	1010	
		HS-SCCH-4: 0	000111111010	1010	
HS-DSCH TF of UE1		In case one tra	ansport block is	signalled on H	<u>IS-SCCH:</u>
		One transport	block with TF c	orresponding	to CQI1
		Precoding vect	tor applied to F	IS-PDSCH sha	all cycle
		through the for	ur possible opti	ons.	
		In case two tra	insport blocks a	<u>are signalled o</u>	<u>n HS-SCCH:</u>
		I wo transport	blocks with the	same size and	dsame
		number of OVS	SF codes as us	ed in the case	of
		transmitting or	ly one transpo	rt block.	
		Precoding mat	trix applied to F	IS-PDSCH sha	all cycle
		through the for	ur possible opti	ons.	
HS-SCCH-1 transmission		The HS-SCCF	I-1 shall be trar	nsmitted contin	uously with
pattern		constant powe	r.	<u></u>	
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with			
pattern		constant powe	er.		
HS-SCCH-1 TTI Signalling	-	The six sub-fra	me HS-SCCH	-1 signalling pa	attern shall
Pattern			0", where "X	indicates III	in which the
		HS-SCCH-1 us	ses the identity	of the UE und	er test, and
		"O" indicates T	TI in which the	eHS-SCCH-1 ι	uses a
		different UE id	entity.		

# 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	est Propagation Reference			e value	
Number	Conditions	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	Propagation	Reference value		
Number	Conditions	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.

Parameter	Unit	Test 1	Test 2	
I <sub>oc</sub>	dBm/3.84 MHz	-6	0	
Phase reference	-	P-CP	ICH	
P-CPICH $E_c / I_{or}$ (*)	dB	-1	0	
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010	
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		every third TTI only, UE und HS-SC	er test addressed solely via CH-1)	
		HS-SCCH-2:000	1001010101010	
		HS-SCCH-3: 000	1101010101010	
		HS-SCCH-4: 000	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 p	ossible options.	
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trar	nsmitted continuously with	
pattern		constant power.		
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with	
pattern		constant power.		
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH	-1 signalling pattern shall	
Pattern		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 9.4.4.1: Test parameters for HS-SCCH Type 3 detection

Test	Propagation			
Number	Conditions	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 9.4.4.2: Minimum requirement for HS-SCCH Type 3 detection, single transport block case with downlink physical channel setup in Table E.5.4A

#### 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.

#### 9.4.4.2. 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	Start
- MIMO N_cqi_typeA/M_cqi ratio	1/2
- MIMO pilot configuration	
- CHOICE Second CPICH pattern	
>Antenna2 P-CPICH	
<ul> <li>Precoding weight set restriction</li> </ul>	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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MH z	-61	0
Phase reference	-	P-CP	ICH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.9	
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-SC	er test addressed solely via CH-1)
		HS-SCCH-2: 000 HS-SCCH-3: 000	1001010101010 1101010101010
		HS-SCCH-4: 000	1111110101010
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		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with	
pattern		constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH be "XOOXOO", where "X HS-SCCH-1 uses the identity "O" indicates TTI in which the different UE identity.	-1 signalling pattern shall "indicates TTI in which the of the UE under test, and HS-SCCH-1 uses a

# 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	Propagation	Reference value		
Number	Conditions	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.

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MHz	-6	0
Phase reference	-	P-CP	ICH
P-CPICH $E_c / I_{or}$ (*)	dB	-1	0
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE under test addressed solely via HS-SCCH-1)	
		HS-SCCH-2: 000 HS-SCCH-3: 000	1001010101010 1101010101010
		HS-SCCH-4:000	1111110101010
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.1: Test parameters for HS-SCCH Type 3 detection

### 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 Propagation		Reference value		
Number	Conditions	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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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 <sub>oc</sub>	dBm/3.84 MHz	-6	0
Phase reference	-	P-CP	NCH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.	.9
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		every third TTI only, UE und (every third TTI only)	ler test addressed solely via CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 000	1111110101010
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1	
		Precoding vector applied t	to HS-PDSCH shall cycle
		through the four p	possible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trai	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall	
Pattern		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.	

Test Propagation	Reference value			
Number Conditions		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 9.4.4A.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

## 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  $E_{\rm m}$  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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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.

Parameter	Unit	Test 1	Test 2		
I <sub>oc</sub>	dBm/3.84 MHz	-6	0		
Phase reference	-	P-CP	ICH		
P-CPICH $E_c/I_{or}$ (*)	dB	-1	0		
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010		
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		every third TTI only, UE und HS-SC	er test addressed solely via CH-1)		
		HS-SCCH-2:000	1001010101010		
		HS-SCCH-3: 000	1101010101010		
		HS-SCCH-4: 000	1111110101010		
HS-DSCH TF of UE1		One transport block with T	F corresponding to CQI1		
		Precoding vector applied to HS-PDSCH shall cycle			
		through the four possible options.			
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trar	nsmitted continuously with		
pattern		constant power.			
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with		
pattern		constant power.			
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall			
Pattern		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.1: Test parameters for HS-SCCH Type 3 detection

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.

### 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 Propagation Number 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  $P(E_{\rm m})$  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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/2
- 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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MH z	-6	0
Phase reference	-	P-CP	ICH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.	9
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(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		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		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.4: Test parameters for HS-SCCH Type 3 detection

### 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	Propagation	Reference value		
Number	Conditions	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.

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84	-6	0
	MH Z		
Phase reference	-	P-CP	ICH
P-CPICH $E_c/I_{or}$ (*)	dB	-1	0
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-SC	er test addressed solely via CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI1	
		Precoding vector applied t	o HS-PDSCH shall cycle
		through the four p	oossible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be transmitted continuously with	
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall	
Pattern		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.1: Test parame	ters for HS-SCCH	Type 3 detection
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### 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	Propagation	Reference value			
Number	Conditions	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  $P(E_{\rm m})$  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	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

#### 9.4.4C.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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MHz	-6	0
Phase reference	-	P-CF	PICH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.	9
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-SC	er test addressed solely via CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 000	1111110101010
HS-DSCH TF of UE1		One transport block with T	F corresponding to CQI1
		Precoding vector applied to HS-PDSCH shall cycle	
		through the four p	possible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trai	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH	-1 signalling pattern shall
Pattern		be "XOOXOO", where "X" indicates TTI in whi	
		HS-SCCH-1 uses the identity	of the UE under test, and
		"O" indicates TTI in which the	e HS-SCCH-1 uses a
		different UE identity.	

Test	Propagation	Reference value			
Number	Conditions	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	

### 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

# 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.

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MHz	-6'	0
Phase reference	-	P-CP	ICH
P-CPICH $E_c / I_{or}$ (*)	dB	-1	0
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		every third TTI only, UE und) HS-SC	er test addressed solely via CH-1)
		HS-SCCH-2:000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 000	1111110101010
HS-DSCH TF of UE1		One transport block with T	F corresponding to CQI1
		Precoding vector applied to HS-PDSCH shall cycle	
		through the four p	possible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall	
Pattern		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.1:	Test r	parameter	s for H	S-SCCH	Type	3 detection
TUDIC	J.4.4D.1.	1000	Junumeter	510111	0.00011	i y po	

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.

### 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	Propagation	Reference value			
Number	Conditions	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
<ul> <li>MIMO N_cqi_typeA/M_cqi ratio</li> </ul>	1/2
- 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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MH z	-6	0
Phase reference	-	P-CP	ICH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.	9
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-SC	er test addressed solely via CH-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		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling Pattern	-	The six sub-frame HS-SCCH be "XOOXOO", where "X HS-SCCH-1 uses the identity "O" indicates TTI in which the different UE identity.	-1 signalling pattern shall "indicates TTI in which the of the UE under test, and HS-SCCH-1 uses a

Table 9.4.4D.4: Test parameters for HS-SCCH Type 3 detection

### 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	Propagation	Reference value		
Number Conditions		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  $E_{\rm m}$ , 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  $E_{\rm m}$  is denoted  $P(E_{\rm m})$ .

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.

Parameter	Unit	Test 1	Test 2
Las	dBm/3.84	-6	0
-00	MHz		
Phase reference	-	P-CP	PICH
P-CPICH $E_c / I_{or}$ (*)	dB	-1	0
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		(every third TTI only, UE und HS-SC	er test addressed solely via CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 0001111110101010	
HS-DSCH TF of UE1		One transport block with TF corresponding to CQI	
		Precoding vector applied t	o HS-PDSCH shall cycle
		through the four p	possible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trar	nsmitted continuously with
pattern		constant power.	
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH-1 signalling pattern shall	
Pattern		be "XOOXOO", where "X" indicates TTI in which the	
		HS-SCCH-1 uses the identity	of the UE under test, and
		"O" indicates 111 in which the	HS-SCCH-1 uses a
		different UE identity.	

Table 9.4.4E.1: Test parameters for HS-SCCH Type 3 detection

### 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	Propagation Reference valu		Reference value	
Number	Conditions	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	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

#### 9.4.4E.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  $E_{\rm m}$  denoted as  $P(E_{\rm m})$  (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

Parameter	Unit	Test 1	Test 2
I <sub>oc</sub>	dBm/3.84 MHz	-6	0
Phase reference	-	P-CF	PICH
P-CPICH $E_c / I_{or}$ (*)	dB	-9.	9
HS-SCCH UE Identity		HS-SCCH-1: 101	0101010101010
$(x_{ue,1}, x_{ue,2},, x_{ue,16})$		every third TTI only, UE und (every third TTI only)	er test addressed solely via CH-1)
		HS-SCCH-2: 000	1001010101010
		HS-SCCH-3: 000	1101010101010
		HS-SCCH-4: 000	1111110101010
HS-DSCH TF of UE1		One transport block with T	F corresponding to CQI1
		Precoding vector applied t	to HS-PDSCH shall cycle
		through the four p	possible options.
HS-SCCH-1 transmission		The HS-SCCH-1 shall be trai	nsmitted continuously with
HS-PDSCH transmission		The HS-PDSCH shall be tran	smitted continuously with
pattern		constant power.	Sinned Continuously with
HS-SCCH-1 TTI Signalling	-	The six sub-frame HS-SCCH	-1 signalling pattern shall
Pattern		be "XOOXOO", where ">	(" indicates TTI in which the
		HS-SCCH-1 uses the identity	of the UE under test, and
		"O" indicates TTI in which the	e HS-SCCH-1 uses a
		different UE identity.	

2

0.01

0.01

Test	Propagation		Reference value	
Number	Conditions	HS-SCCH-1		
		$E_c/I_{or}$ (dB)	I <sub>or</sub> / I <sub>oc</sub> ( <b>dB</b> )	$P(E_m)$

0.8

0.8

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	

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)

-15.3

-16.7

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

PA3

VA3

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 <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version	-	{0,3}	
coding sequence			
Maximum number of		2	
HARQ transmission	-	Z	
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	Propagation	Reference value		
Number	Conditions	HS-PDSCH E <sub>a</sub> /I <sub>m</sub> (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 0.153 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
<ul> <li>HS-SCCHless HS-DSCH operation support</li> </ul>	TRUE

Information Element	Value/remark
- Added or Reconfigured DL TrCH information	
- CHOICE DL parameters	HS-DSCH
- HARQ Info	Not Present
<ul> <li>Added or reconfigured MAC-d flow</li> </ul>	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	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	1
- Transport Block Size List	1
- Transport Block Size Index	40
	Index of "information Bit Payload = 605" of H-Set 7 is
	defined in Annex A of TS25.321 [13].
<ul> <li>HS-PDSCH Second Code Support</li> </ul>	FALSE

#### RADIO BEARER SETUP message: AM or UM (HSDPA)

#### 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	r Testing QPSK FRC H-Set 7
------------------------------------	----------------------------

Parameter	Unit	Test 1
Phase reference	-	P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60 (No test toleranœ 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 constan		
power. HS-SCCH-1 shall only use the identity of the UE under test for		
redundancy version 3 transmissions intended for the UE.		

Test	Propagation	Re	eference value	
Number	Conditions	HS-PDSCH E / I (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 <sub>oc</sub>	dBm/3.84 MHz	-60	
Redundancy and			
constellation version	-	{0,3}	
coding sequence			
Maximum number of	_	2	
HARQ transmission	_	2	
NOTE: The HS-SCCH-	CH-1 and HS-PDSCH shall be transmitted continuously with constant		
power. HS-SCC	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	Propagation	Reference value		
Number	Conditions	HS-PDSCH	Î (J (dD)	T-put R
		$E_c/I_{or}$ (dB)	I <sub>or</sub> / I <sub>oc</sub> (α <b>Β</b> )	(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 0.153 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.

1422

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
<ul> <li>HS-SCCHless HS-DSCH operation support</li> </ul>	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	
<ul> <li>MAC-hs queue to add or reconfigure list</li> </ul>	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	1
- Transport Block Size List	1
<ul> <li>Transport Block Size Index</li> </ul>	40
	Index of "information Bit Payload = 605" of H-Set 7 is
	defined in Annex A of TS25.321 [13].
<ul> <li>HS-PDSCH Second Code Support</li> </ul>	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.

Parameter	Unit	Test 1	
Phase reference	-	P-CPICH	
I <sub>oc</sub>	dBm/3.84 MHz	-60 (no test toleranœ applied)	
Redundancy and			
constellation version	-	{0,3}	
coding sequence			
Maximum number of	_	2	
HARQ transmission	-	Σ	
NOTE: The HS-SCCH-	ITE: The HS-SCCH-1 and HS-PDSCH shall be transmitted continuously with constant		
power. HS-SCC	power. HS-SCCH-1 shall only use the identity of the UE under test for		
redundancy vers	sion 3 transmissions i	ntended for the UE.	

Table 9.5.1A.3: Test Parameters for Testing QPSK FRC H-Set 7

Table 9.5.1A.4: Test requirement, Enhanced requirement type 1,Fixed Reference Channel (FRC) H-Set 7

Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	<i>î (1</i> (dB)	T-put R
		$E_c/I_{or}$ (dB)	$I_{or}/I_{oc}$ (ub)	(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.

Parameter	Unit	Test 1
Phase reference		P-CPICH
I <sub>oc</sub>	dBm/3.84 MHz	-60
Redundancy and constellation version coding sequence		{0,2,5,6}
Number of HARQ transmission		4
OTE 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 the different redu	ne HS-PDSCH is transmitted using all four HARQ transmissions cycling through e different redundancy and constellation versions.	

Table 9.6.1.1: Test Parameters for Testing QPSK FRCs H-Set 3

Test	Propagation		Reference value
Number	Conditions	HS-PDSCH	RLC SDU ER
		$E_c/I_{or}$ (dB)	$\hat{I}_{or}/I_{oc} = 0 \ \mathbf{dB}$
1	VA30	-6	0.82

#### Table 9.6.1.2: Minimum requirement QPSK, Fixed Reference Channel (FRC) H-Set 3

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 down link 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 3<sup>rd</sup> 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 rea	uirement QPSK, Fixed Reference	Channel (FRC) H-Set 3
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Test	Propagation	Reference value		
Number	Conditions	HS-PDSCH	RLC SDU ER	
		$E_c/I_{or}$ (dB)	$\hat{I}_{or} / I_{oc}$ = 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.

Parameter	Unit	Test 1	Test 2	Test 3
Lag	dBm/3.84	-60		
-00	MHz			
Phase reference	-		P-CPICH	
P-CPICH $E_c / I_{or}$ (*)	Db		-10	
HS-SCCH UE Identity		HS-SCCH-1: 1010101010101010		
$(x_{1}, x_{2}, \dots, x_{n})$		(UE under test addressed solely via HS-SCCH-1)		
( ue,1 ' ue,2 ' ' ue,16 '		HS-SCCH-2: 0001001010101010		0101010
HS-DSCH TF of UE1		TF	corresponding to	CQI1
HS-SCCH-1 transmission		The HS-SCCH-1 shall be transmitted continuously with		
pattern		constant power.		
HS-PDSCH transmission		The HS-PDSCH sh	all be transmitted	continuously with
pattern		constant power, wi	thout re-transmiss	sions.
HS-SCCH-1 TTI Signalling	-	The identity of the U	JE under test sha	Il be used on every
Pattern		fourth TTI.		

#### Table 9.6.2.1: Test parameters for HS-SCCH detection - single link

Table 9.6.2.2: Minimum requirement for HS-SCCH detection - single link

Test	Propagation	Reference value		
Number	Conditions	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 down link 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 3<sup>rd</sup> 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.

Test	Propagation	Reference value		
Number	Conditions	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

Table 9.6.2.3: Test requirement for HS-SCCH detection -	single	link
	Single	