



Appendix F - FCC 3G SAR Measurement Procedures for WCDMA

Conducted Output Power:

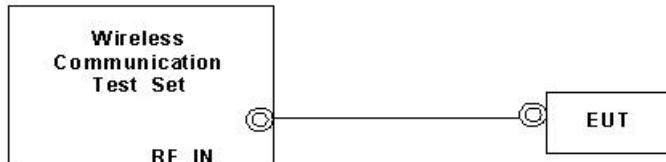
The PBA is fulfilled. The EUT was tested according to the requirements of the FCC 3G procedures and the TS 34.121. The EUT's WCDMA and HSPA function is Release 6 version supporting HSDPA Category 8, and HSUPA Category 5. A detailed analysis of the output power for all WCDMA and HSPA (HSUPA&HSDPA) modes is provided in the tables below. According to the FCC 3G procedures, handsets with both HSDPA and HSUPA should be tested according to Release 6 HSPA test procedures, and the EUT does not support VOIP function over the HSPA function. Device was tested according to procedure KDB941225 - section Release 6 HSPA Data Devices as documented/evaluated in the following table.

WCDMA SAR Test mode - Conducted Power							
Mode	Setup	Cell band (850)			PCS band (1900)		
		CH4132	CH4182	CH4233	CH9262	CH9400	CH9538
		826.4 (MHz)	836.4 (MHz)	846.6 (MHz)	1852.4 (MHz)	1880.0 (MHz)	1907.6 (MHz)
R99- WCDMA	RMC 12.2Kbps	24.53	24.35	24.29	23.99	24.15	23.96
R5-HSDPA	HSDPA - subtest 1	24.37	24.25	24.14	23.94	24.09	23.95
	HSDPA - subtest 2	23.85	23.68	23.56	23.38	23.13	23.06
	HSDPA - subtest 3	23.79	23.72	23.61	23.45	23.55	23.61
	HSDPA - subtest 4	23.37	23.38	23.21	22.96	22.77	22.69
R6- HSPA (HSUPA&HSDPA)	HSUPA - subtest 1	23.56	23.79	23.56	23.77	23.88	23.45
	HSUPA - subtest 2	21.96	21.84	21.52	21.54	21.70	21.45
	HSUPA - subtest 3	22.95	22.83	22.62	22.73	22.76	22.47
	HSUPA - subtest 4	22.50	22.21	22.16	22.09	22.09	21.86
	HSUPA - subtest 5	23.56	23.73	23.51	23.68	23.85	23.42



WCDMA Setup Configuration:

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting
 - i. Data rates: Varied from RMC 12.2Kbps.
 - ii. RMC Test Loop=Loop Mode 1
 - iii. Power Ctrl Mode= All Up bits.
- d. The transmitted maximum output power was recorded.



Setup Configuration

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors(β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121.
 - iii. Set RMC12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters.
 - vii. Set DeltaACK , DeltaNACK and DeltaCQI =8.
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2 .
 - xi. Power Ctrl Mode= All Up bits.
- d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

**HSPA (HSUPA & HSPDA) Setup Configuration:**

- The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- The RF path losses were compensated into the measurements.
- A call was established between EUT and Base Station with following setting * :
 - Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121.
 - Set Cell Power = -86 dBm
 - Set Channel Type = 12.2k + HSPA
 - Set UE Target Power
 - Power Ctrl Mode= Alternating bits.
 - Set and observe the E-TFCI
 - Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtests' E-TFCI.
- The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.**Setup Configuration**

Note: For details settings in the Agilent 8960 test equipment, please refer to the user guide " HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18"



Call Setup Screen								
Call Control	Active Cell Operating Mode							Call Params
Channel (UARFCN) Info	UE Information							Cell Power
	IMSI:							-86.00
Cell Parameters	IMEI:							dBm/3.84 MHz
Generator Info	Power Class:							Channel Type
	UE Expected Open Loop Transmit Power							12.2k + HSPA
	Initial PRACH TX Power: -11.70 dBm							Paging Service
	Initial DPCCH TX Power: -0.56 dBm							RB Test Mode
Uplink Parameters	Uplink Parameters				Value			
	PRACH Preambles				64			
	PRACH Ramping Cycles(MMAX)				2			
	Available Subchannels (Bit Mask)				0000000000001			
UE Rep. Meas	Uplink DPCH Scrambling Code				0			
	Uplink DPCH Bc/Bd Control				Manual			
	Manual Uplink DPCH Bc				11			
Close Menu	Manual Uplink DPCH Bd				15			
	Maximum Uplink Transmit Power Level				21 dBm			
		Active Cell			Sys Type: UTRA FDD			
		Idle						
2 of 4			IntRef	Offset				1 of 3

**Example for HSPA Subtest 1, and other subtests following table, C11.1.3
(Gain Factors ($\beta_c = 11$ and $\beta_d = 15$))**

Call Control		Active Cell Operating Mode						Serving Grant						
Additional Screens		UE Information						AG Node						
		IMSI:						Single Shot						
Cell Parameters		IMEI:						Single Shot AG						
		Power Class:						20: (119/15)^2						
Generator Info		UE Expected Open Loop Transmit Power						Send Single Shot Absolute Grant						
		Initial PRACH TX Power:			-11.70 dBm			Send Relative Grant Up						
Uplink Parameters		Initial DPCCH TX Power:			-0.56 dBm			Send Relative Grant Down						
UE Rep Meas		Call Processing Status												
Trig Output Setup		Current Service Type: Abs Single Shot AG												
Sys Frame Clock		GMM Status: Index 15: (67/15)^2												
		GMM State: Index 16: (75/15)^2												
HSUPA In		Current DPCH: Index 17: (84/15)^2												
UE Rep E-DCH		UE Rep E-DCH: Index 18: (95/15)^2												
Last Received		Last Received: Index 19: (106/15)^2												
Throughput:		Throughput: Index 20: (119/15)^2												
ACKs Transmitted		ACKs Transmitted: -----												
		Active Cell						Return						
		Idle						1 of 2						
2 of 4				IntRef	Offset									

Example: AG – Index = 20 for HSPA subtest 1



Call Setup Screen		Recorded E-TFCI Information		E-TFCI Record																																																																																																					
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Recorded E-TFCI Values			Start Recording E-TFCI Values																																																																																																						
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Offset																																																																																																									

Example: Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1

Reference:

- [1] 941225 D01 SAR test for 3G devices v02, SAR Measurement Procedures for 3G Devices CDMA 2000/Ev-Do/WCDMA/HSDPA/HSPA Oct. 2007 Laboratory Division Office of Engineering and Technology Federal Communications Commission
- [2.] TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification, Radio Transmission and Reception (FDD)
- [3.] HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18