

Appendix F - FCC 3G SAR Measurement Procedures

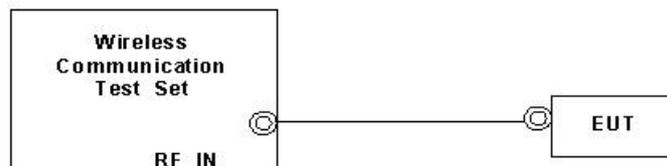
Conducted Output Power

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, HSPDA, 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. The HSPA output levels are less than ¼ dB higher than the basic 12.2 kbps RMC configurations in WCDMA, as required by FCC 3G SAR procedures, and then the PBA is fulfilled.

WCDMA SAR Test mode - Conducted Power							
Mode	Setup	PCS band (1900)			-		
		CH9262	CH9400	CH9538	-	-	-
		1852.4 (MHz)	1880.0 (MHz)	1907.6 (MHz)	-	-	-
R99 - WCDMA	RMC 12.2Kbps	23.40	23.77	23.37	-	-	-
	AMR 12.2Kbps	23.40	23.75	23.32	-	-	-
R6 - HSDPA Only	HSDPA - subtest 1	23.30	23.66	23.33	-	-	-
R6 - HSPA (HSUPA&HSDPA)	HSUPA - subtest 1	22.55	22.76	22.50	-	-	-
	HSUPA - subtest 2	20.79	20.83	20.77	-	-	-
	HSUPA - subtest 3	21.71	21.91	21.77	-	-	-
	HSUPA - subtest 4	21.29	21.45	21.20	-	-	-
	HSUPA - subtest 5	22.62	23.09	22.92	-	-	-

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 Δ_{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 Δ_{NACK} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$, and Δ_{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 DPDCCH, 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 $\beta_d = 15/15$.

HSPA (HSUPA & HSPDA) 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. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. 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.
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits.
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtests' E-TFCI.
- d. 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	209/225	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	β_{ed1} : 47/15 β_{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 $\beta_{Hz} = 30/15 * \beta_c$.

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.

* 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"



Example for HSPA Subtest 1, and other subtests following table, C11.1.3

Call Setup Screen		
Call Control	Active Cell Operating Mode	Call Parms
Channel (UARFCN) Info	UE Information	Cell Power
Cell Parameters	IMSI: IMEI: Power Class:	-86.00 dBm/3.84 MHz
Generator Info	UE Expected Open Loop Transmit Power	Channel Type
	Initial PRACH TX Power: -11.70 dBm Initial DPCCCH TX Power: -0.56 dBm	12.2k + HSPA
	Uplink Parameters	Paging Service
		RB Test Mode
Uplink Parameters	Value	HSPA Parameters
	PRACH Preambles: 64	
	PRACH Ramping Cycles(MMAX): 2	
	Available Subchannels (Bit Mask): 000000000001	
UE Rep Meas	Uplink DPCH Scrambling Code: 0	34,121 Preset Call Configs
	Uplink DPCH Bc/Bd Control: Manual	
	Manual Uplink DPCH Bc: 11	
Close Menu	Manual Uplink DPCH Bd: 15	Channel (UARFCN) Parms
	Maximum Uplink Transmit Power Level: 21 dBm	
	Active Cell	Sys Type: UTRA FDD
	Idle	
2 of 4	IntRef Offset	1 of 3

Gain Factors ($\beta_c = 11$ and $\beta_d = 15$)

Call Setup Screen		
Call Control	Active Cell Operating Mode	Serving Grant
Additional Screens	UE Information	AG Mode
Cell Parameters	IMSI: IMEI: Power Class:	Single Shot
Generator Info	UE Expected Open Loop Transmit Power	Single Shot AG
	Initial PRACH TX Power: -11.70 dBm Initial DPCCCH TX Power: -0.56 dBm	20: $(119/15)^2$
	Call Processing Status	Send Single Shot Absolute Grant
Uplink Parameters	Current Service Type: None MI Status: Abs Single Shot AG GMM State: Index 15: $(67/15)^2$ Current DPCH: Index 16: $(75/15)^2$	Send Relative Grant Up
UE Rep Meas	HSUPA In: Index 17: $(84/15)^2$ UE Rep E-DCH: Index 18: $(95/15)^2$	Send Relative Grant Down
Trig Output Setup	Last Received: Index 19: $(106/15)^2$ Throughput: Index 20: $(119/15)^2$	Return
Sys Frame Clock	ACKs Transmitted: -----	
	Active Cell	Sys Type: UTRA FDD
	Idle	
2 of 4	IntRef Offset	1 of 2

Example: AG – Index = 20 for HSPA subtest 1



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Channel (UARFCN) Info	E-TFCI Recording State		E-TFCI Rec Count																																																																																																				
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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