



Appendix F. FCC 3G SAR Measurement Procedures

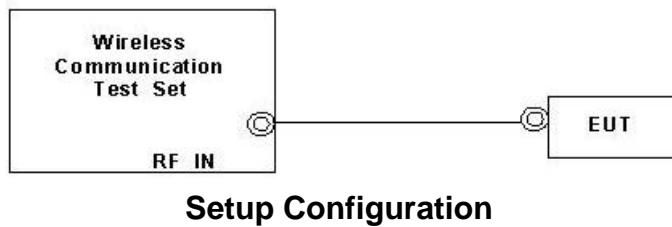
Conducted Output Power:

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 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)			AWS band (1700)			PCS band (1900)	
		CH4132	CH4182	CH4233	CH1312	CH1413	CH1513	CH9262	CH9400
		826.4 (MHz)	836.4 (MHz)	846.6 (MHz)	1712.4 (MHz)	1732.6 (MHz)	1752.6 (MHz)	1852.4 (MHz)	1880.0 (MHz)
WCDMA	RMC 12.2Kbps	23.70	23.76	23.66	23.78	23.85	23.81	23.97	24.00
HSDPA	Subtest 1	23.25	23.26	23.24	23.33	23.23	23.19	23.49	23.46
	Subtest 2	23.24	23.29	23.27	23.36	23.29	23.31	23.45	23.48
	Subtest 3	22.82	22.85	22.88	22.80	22.76	22.78	22.92	22.97
	Subtest 4	22.63	22.75	22.67	22.76	22.78	22.75	22.89	22.95
HSUPA	Subtest 1	23.08	23.06	23.03	23.07	23.23	23.16	23.10	23.08
	Subtest 2	21.60	21.59	21.65	21.80	21.85	21.85	21.76	21.90
	Subtest 3	21.77	22.03	21.96	22.00	22.03	22.03	22.16	22.07
	Subtest 4	21.92	22.09	21.88	22.30	22.51	22.41	22.33	22.21
	Subtest 5	22.77	23.10	23.08	23.05	23.21	23.04	23.07	23.14

**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.





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: $\Delta_{ACK}, \Delta_{NACK}$ 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 subtest's 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: Δ_{ACK} , Δ_{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					CallParms
Channel (UARFCN) Info	UE Information					Cell Power
Cell Parameters	IMSI: IMEI: Power Class:					-86.00
Generator Info	UE Expected Open Loop Transmit Power					dBm/3.84 MHz
Uplink Parameters	Initial PRACH TX Power: -11.70 dBm Initial DPCCH TX Power: -0.56 dBm					Channel Type
UE Rep Ileas	Uplink Parameters					12.2k + HSPA
Close Ileas	Value					Paging Service
2 of 4	PRACH Preambles					RB Test Mode
	PRACH Ramping Cycles(NMAX)					HSPA Parameters
	Available Subchannels (Bit Mask)					34.121 Preset Call Configs
	Uplink DPCH Scrambling Code					Channel (UARFCN)Parms
	Uplink DPCH Bc/Bd Control					1 of 3
	Manual Uplink DPCH Bc					
	Manual Uplink DPCH Bd					
	Maximum Uplink Transmit Power Level					
	Active Cell Idle					
	Sys Type: UTRA FDD					
	IntRef Offset					

Example for HSPA Subtest 1, and other subtests following table, C11.1.3
(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
Uplink Parameters	Initial PRACH TX Power: -11.70 dBm Initial DPCCH TX Power: -0.56 dBm					20: (119/15)^2
UE Rep Ileas	Call Processing Status					Send Single Shot Absolute Grant
Trig Output Setup	Current Service Type: None R11 Status: Abs Single Shot AG GMM State: Index 15: (67/15)^2 Current DPCH Index 16: (75/15)^2					Send Relative Grant Up
Sys Frame Clock	HSUPA Info UE Rep E-DCH Index 17: (84/15)^2 Last Received Index 18: (95/15)^2 Throughput: Index 19: (106/15)^2 ACKs Transmitt Index 20: (119/15)^2					Send Relative Grant Down
2 of 4	Active Cell Idle					Return
	Sys Type: UTRA FDD					1 of 2

Example: AG – Index = 20 for HSPA subtest 1



Call Setup Screen												E-TFCI Record
Screen Ctrl	Recorded E-TFCI Information											E-TFCI Rec Count
Channel (UARFCN) Info	E-TFCI Recording State											15
HSPA Information	Idle											Start Recording E-TFCI Values
E-TFCI Recording Information	Recorded E-TFCI Values											Send Step Up TPC Bit Pattern
Clear UE Info	1: 75	11: 75	21: ----	31: ----	41: ----							Send Step Down TPC Bit Pattern
Return	2: 75	12: 75	22: ----	32: ----	42: ----							Return
	3: 75	13: 75	23: ----	33: ----	43: ----							
	4: 75	14: 75	24: ----	34: ----	44: ----							
	5: 75	15: 75	25: ----	35: ----	45: ----							
	6: 75	16: ----	26: ----	36: ----	46: ----							
	7: 75	17: ----	27: ----	37: ----	47: ----							
	8: 75	18: ----	28: ----	38: ----	48: ----							
	9: 75	19: ----	29: ----	39: ----	49: ----							
	10: 75	20: ----	30: ----	40: ----	50: ----							
	15/15											
	Background	Active Cell Connected				Sys Type: UTRA FDD						
			IntRef	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