



Appendix F - FCC 3G SAR Measurement Procedures for WCDMA

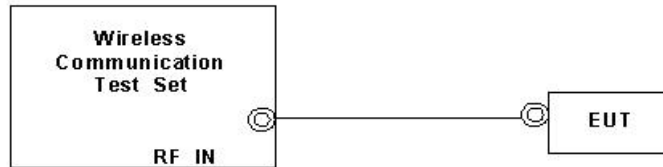
Conducted Output Power:

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 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 $\beta_d = 15/15$.

Setup Configuration

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	209/25	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	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 $\beta_{hs} = 30/15 * \beta_c$.

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 Parms																		
Channel (UARFCH) Info	UE Information				Cell Power																		
	INSI: INEI: Power Class:				-86.00																		
Cell Parameters	UE Expected Open Loop Transmit Power				dBm/3.84 MHz																		
	Initial PRACH TX Power: -11.70 dBm Initial DPCCCH TX Power: -0.56 dBm				Channel Type																		
Generator Info	Uplink Parameters				12.2k + HSPA																		
	<table border="1"> <thead> <tr> <th>Uplink Parameters</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>PRACH Preambles</td> <td>64</td> </tr> <tr> <td>PRACH Ramping Cycles (N_{MAX})</td> <td>2</td> </tr> <tr> <td>Available Subchannels (Bit Mask)</td> <td>000000000001</td> </tr> <tr> <td>Uplink DPCH Scrambling Code</td> <td>0</td> </tr> <tr> <td>Uplink DPCH Bc/Bd Control</td> <td>Manual</td> </tr> <tr> <td>Manual Uplink DPCH Bc</td> <td>11</td> </tr> <tr> <td>Manual Uplink DPCH Bd</td> <td>15</td> </tr> <tr> <td>Maximum Uplink Transmit Power Level</td> <td>21 dBm</td> </tr> </tbody> </table>				Uplink Parameters	Value	PRACH Preambles	64	PRACH Ramping Cycles (N _{MAX})	2	Available Subchannels (Bit Mask)	000000000001	Uplink DPCH Scrambling Code	0	Uplink DPCH Bc/Bd Control	Manual	Manual Uplink DPCH Bc	11	Manual Uplink DPCH Bd	15	Maximum Uplink Transmit Power Level	21 dBm	Paging Service
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Uplink Parameters					RB Test Mode																		
					HSPA Parameters																		
UE Rep Params					34,121 Preset Call Configs																		
					Channel (UARFCH) Parms																		
Close Menu																							
			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 Setup Screen																							
Call Control	Active Cell Operating Mode				Serving Grant																		
Additional Screens	UE Information				AG Mode																		
	INSI: INEI: Power Class:				Single Shot																		
Cell Parameters	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																		
Generator Info	Call Processing Status				Send Single Shot Absolute Grant																		
	<table border="1"> <thead> <tr> <th colspan="2">Current Service Type: Mode</th> </tr> </thead> <tbody> <tr> <td>MM Status:</td> <td>Abs Single Shot AG</td> </tr> <tr> <td>GMN State:</td> <td>Index 15: (67/15)²</td> </tr> <tr> <td>Current DPCH</td> <td>Index 16: (75/15)²</td> </tr> <tr> <td>HSUPA In</td> <td>Index 17: (84/15)²</td> </tr> <tr> <td>UE Rep E-DCH</td> <td>Index 18: (95/15)²</td> </tr> <tr> <td>Last Received</td> <td>Index 19: (106/15)²</td> </tr> <tr> <td>Throughput:</td> <td>Index 20: (119/15)²</td> </tr> <tr> <td>ACKs Transmitted:</td> <td></td> </tr> </tbody> </table>				Current Service Type: Mode		MM Status:	Abs Single Shot AG	GMN State:	Index 15: (67/15) ²	Current DPCH	Index 16: (75/15) ²	HSUPA In	Index 17: (84/15) ²	UE Rep E-DCH	Index 18: (95/15) ²	Last Received	Index 19: (106/15) ²	Throughput:	Index 20: (119/15) ²	ACKs Transmitted:		Send Relative Grant Up
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Throughput:	Index 20: (119/15) ²																						
ACKs Transmitted:																							
Uplink Parameters					Send Relative Grant Down																		
					Return																		
UE Rep Params																							
Trig Output Setup																							
Sys Frame Clock																							
			Active Cell		Sys Type: UTRA FDD																		
			Idle																				
2 of 4		IntRef		Offset																			
				1 of 2																			

Example: AG – Index = 20 for HSPA subtest 1



Call Setup Screen						
Screen Ctrl	Recorded E-TFCI Information					E-TFCI Record
Channel (UARFCN) Info	E-TFCI Recording State					E-TFCI Rec Count
	Idle					15
HSPA Information	Recorded E-TFCI Values					Start Recording E-TFCI Values
E-TFCI Recording Information	1: 75	11: 75	21: ----	31: ----	41: ----	Send Step Up TPC Bit Pattern
	2: 75	12: 75	22: ----	32: ----	42: ----	
	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: ----	
Clear UE Info	15/15					Send Step Down TPC Bit Pattern
Return						Return
	Background	Active Cell		Sys Type: UTRA FDD		
		Connected				
		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