



Appendix F - FCC 3G SAR Measurement Procedures

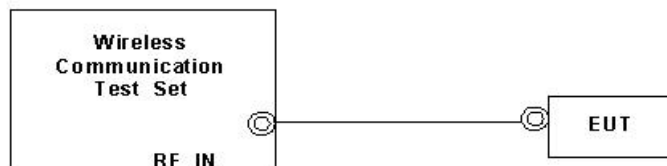
Conducted Output Power:

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, 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. Device was tested according to procedure KDB941225 - section Release 6 HSPA Data Devices as documented/evaluated in the following table. Power values for HSPA are less than ¼ dB higher than the basic 12.2 kbps RMC configurations in WCDMA.

WCDMA SAR Test mode - Conducted Power							
Mode	Setup	AWS band (1700)			PCS band (1900)		
		CH1312	CH1413	CH1513	CH9262	CH9400	CH9538
		1712.4 (MHz)	1732.6 (MHz)	1752.6 (MHz)	1852.4 (MHz)	1880.0 (MHz)	1907.6 (MHz)
R99- WCDMA	RMC 12.2Kbps	22.52	22.61	22.65	22.45	22.62	22.35
R5-HSDPA	HSDPA - subtest 1	22.20	22.40	22.42	22.42	22.51	22.20
	HSDPA - subtest 2	21.85	21.20	22.13	21.92	22.05	21.70
	HSDPA - subtest 3	21.84	21.90	22.03	21.95	22.04	21.83
	HSDPA - subtest 4	21.85	21.88	22.05	21.78	22.00	21.70
R6- HSPA (HSUPA&HSDPA)	HSUPA - subtest 1	21.93	22.05	22.44	22.04	22.35	21.92
	HSUPA - subtest 2	20.15	20.18	20.33	20.00	20.24	20.06
	HSUPA - subtest 3	21.16	21.16	21.25	21.09	21.34	20.91
	HSUPA - subtest 4	20.00	20.20	20.23	20.00	20.16	19.98
	HSUPA - subtest 5	22.14	22.02	22.21	21.90	22.55	21.92

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 $\Delta_{CQI} = 30/15$ 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 DPCCH, DPCCCH 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 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						Call Parms	
Channel (UARFCH) Info		UE Information INSI: INEI: Power Class:						Cell Power	
								-86.00	
Cell Parameters		UE Expected Open Loop Transmit Power Initial PRACH TX Power: -11.70 dBm Initial DPCH TX Power: -0.56 dBm						dBm/3.84 MHz	
								Channel Type	
Generator Info		Uplink Parameters						12.2k + HSPA	
								Paging Service	
Uplink Parameters		Value						RB Test Mode	
								HSPA Parameters	
UE Rep Params		PRACH Preambles: 64 PRACH Ramping Cycles(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						34.121 Preset Call Configs	
								Channel (UARFCH) Parms	
Close Menu		Active Cell Idle						Sys Type: UTRA FDD	
								1 of 3	
2 of 4		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 INSI: INEI: Power Class:						AG Mode	
								Single Shot	
Cell Parameters		UE Expected Open Loop Transmit Power Initial PRACH TX Power: -11.70 dBm Initial DPCH TX Power: -0.56 dBm						Single Shot AG	
								20: $(119/15)^2$	
Generator Info		Call Processing Status Current Service Type: Mode RM Status: RM State: Current DPCH HSUPA In UE Rep E-DCH Last Received Throughput: ACKs Transmitted						Send Single Shot Absolute Grant	
								Send Relative Grant Up	
Uplink Parameters		Abs Single Shot AG Index 15: $(67/15)^2$ Index 16: $(75/15)^2$ Index 17: $(84/15)^2$ Index 18: $(95/15)^2$ Index 19: $(106/15)^2$ Index 20: $(119/15)^2$						Send Relative Grant Down	
								Return	
UE Rep Params		OSCH Cat: ---- Ratio: ---- % kbps Transmitted: ----							
Trig Output Setup Sys Frame Clock		Active Cell Idle						Sys Type: UTRA FDD	
								1 of 2	
2 of 4		IntRef Offset							

Example: AG – Index = 20 for HSPA subtest 1



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

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

Reference:

- [1] KDB 941225 D01 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