



## **Appendix F - FCC 3G SAR Measurement Procedures**

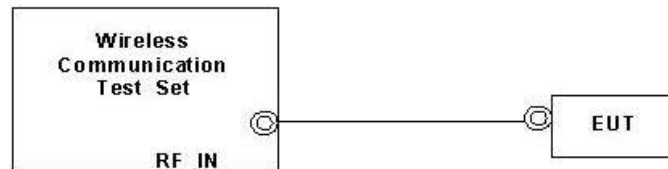
### **Conducted Output Power:**

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 6. 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.

<b>WCDMA SAR Test mode - Conducted Power</b>							
<b>Mode</b>	<b>Setup</b>	<b>Cell band (850)</b>			<b>PCS band (1900)</b>		
		<b>CH4132</b>	<b>CH4182</b>	<b>CH4233</b>	<b>CH9262</b>	<b>CH9400</b>	<b>CH9538</b>
		<b>826.4 (MHz)</b>	<b>836.4 (MHz)</b>	<b>846.6 (MHz)</b>	<b>1852.4 (MHz)</b>	<b>1880.0 (MHz)</b>	<b>1907.6 (MHz)</b>
<b>R99 - WCDMA</b>	<b>RMC 12.2Kbps</b>	22.22	22.65	22.32	22.47	23.00	22.89
<b>R5 - HSDPA</b>	<b>HSDPA - subtest 1</b>	22.10	22.49	22.08	22.32	22.88	22.87
	<b>HSDPA - subtest 2</b>	21.99	22.48	22.14	22.27	22.93	22.88
	<b>HSDPA - subtest 3</b>	21.71	22.06	21.81	21.95	22.41	22.30
	<b>HSDPA - subtest 4</b>	21.43	22.00	21.73	21.89	22.37	22.28
<b>R6 - HSPA (HSUPA &amp; HSDPA)</b>	<b>HSUPA - subtest 1</b>	20.82	21.43	20.99	21.17	21.62	22.02
	<b>HSUPA - subtest 2</b>	19.13	19.62	19.29	19.59	20.01	19.87
	<b>HSUPA - subtest 3</b>	20.20	20.70	20.36	20.69	21.15	21.13
	<b>HSUPA - subtest 4</b>	19.70	20.18	19.86	20.14	20.53	20.50
	<b>HSUPA - subtest 5</b>	21.20	21.74	21.39	21.61	22.04	22.03

**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( $\beta_c$  and  $\beta_d$ ) 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:  $\beta$  values for transmitter characteristics tests with HS-DPCCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}$ (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,  $\Delta_{ACK}$  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  $\beta_c/\beta_d$  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 ( $\beta_c$  and  $\beta_d$ ) 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:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (Note 5) (Note 6)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (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  $\beta_c/\beta_d$  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  $\beta_c/\beta_d$  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:  $\beta_{ed}$  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 (UARFCN) 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 Meas		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 (UARFCN) 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: None MM Status: Abs Single Shot AG GMM 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: ----- ACKs Received: -----						Send Single Shot Absolute Grant	
								Send Relative Grant Up	
Uplink Parameters		Information OSCH Cat: ---- Ratio: ---- % ----- kbps Transmitted: ----						Send Relative Grant Down	
								Return	
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																																																																																																				
HSPA Information	<div>Recorded E-TFCI Values</div> <table><tbody><tr><td>1:</td><td>75</td><td>11:</td><td>75</td><td>21:</td><td>----</td><td>31:</td><td>----</td><td>41:</td><td>----</td></tr><tr><td>2:</td><td>75</td><td>12:</td><td>75</td><td>22:</td><td>----</td><td>32:</td><td>----</td><td>42:</td><td>----</td></tr><tr><td>3:</td><td>75</td><td>13:</td><td>75</td><td>23:</td><td>----</td><td>33:</td><td>----</td><td>43:</td><td>----</td></tr><tr><td>4:</td><td>75</td><td>14:</td><td>75</td><td>24:</td><td>----</td><td>34:</td><td>----</td><td>44:</td><td>----</td></tr><tr><td>5:</td><td>75</td><td>15:</td><td>75</td><td>25:</td><td>----</td><td>35:</td><td>----</td><td>45:</td><td>----</td></tr><tr><td>6:</td><td>75</td><td>16:</td><td>----</td><td>26:</td><td>----</td><td>36:</td><td>----</td><td>46:</td><td>----</td></tr><tr><td>7:</td><td>75</td><td>17:</td><td>----</td><td>27:</td><td>----</td><td>37:</td><td>----</td><td>47:</td><td>----</td></tr><tr><td>8:</td><td>75</td><td>18:</td><td>----</td><td>28:</td><td>----</td><td>38:</td><td>----</td><td>48:</td><td>----</td></tr><tr><td>9:</td><td>75</td><td>19:</td><td>----</td><td>29:</td><td>----</td><td>39:</td><td>----</td><td>49:</td><td>----</td></tr><tr><td>10:</td><td>75</td><td>20:</td><td>----</td><td>30:</td><td>----</td><td>40:</td><td>----</td><td>50:</td><td>----</td></tr></tbody></table> <div>15/15</div>		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
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:	----																																																																																														
E-TFCI Recording Information			Send Step Up TPC Bit Pattern																																																																																																				
Clear UE Info			Send Step Down TPC Bit Pattern																																																																																																				
Return			Return																																																																																																				
<div>Background</div> <div>Active Cell Connected</div> <div>IntRef</div> <div>Offset</div>		<div>Sys Type: UTRA FDD</div>																																																																																																					

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