

# Appendix E. 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 supports WCDMA and HSPA function. 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.

#### <without Power Reduction>

WCDMA SAR Test mode - Conducted Power										
			II band (8		PCS band (1900)					
Mada	Cotum	CH4132	CH4182	CH4233	CH9262	CH9400	CH9538			
Mode	Setup	826.4	836.4	846.6	1852.4	1880.0	1907.6			
		(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)			
WCDMA	RMC 12.2Kbps	23.06	23.18	22.95	22.83	22.85	22.88			
	Subtest 1	23.15	23.14	23.11	22.11	22.15	22.10			
HSDPA	Subtest 2	23.08	23.13	23.03	22.19	22.16	22.07			
порга	Subtest 3	22.74	22.78	22.60	21.61	21.59	21.60			
	Subtest 4	22.58	22.61	22.50	21.54	21.60	21.57			
	Subtest 1	22.20	22.23	22.09	21.96	21.91	21.97			
	Subtest 2	20.01	19.99	20.11	20.16	20.19	20.15			
HSUPA	Subtest 3	20.26	20.28	20.14	21.15	21.17	19.90			
	Subtest 4	20.11	20.15	20.10	20.10	19.99	19.87			
	Subtest 5	22.06	22.11	22.19	21.93	21.92	21.95			

#### <with Power Reduction>

WCDMA SAR Test mode - Conducted Power										
		Ce	II band (8	50)	PCS band (1900)					
Mode	Setup	CH4132	CH4182	CH4233	CH9262	CH9400	CH9538			
	Setup	826.4	836.4	846.6	1852.4	1880.0	1907.6			
		(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)			
WCDMA	RMC 12.2Kbps	19.13	19.12	19.16	18.84	18.88	18.90			
	Subtest 1	19.28	19.31	19.15	18.24	18.51	18.14			
HSDPA	Subtest 2	19.30	19.27	19.14	18.24	18.22	18.08			
порга	Subtest 3	18.76	18.88	18.78	17.72	17.73	17.44			
	Subtest 4	18.75	18.78	18.80	17.78	17.69	18.56			
	Subtest 1	18.97	19.10	19.15	18.17	18.14	17.99			
	Subtest 2	17.10	17.07	17.08	16.22	16.13	16.17			
HSUPA	Subtest 3	18.08	18.12	18.17	16.74	17.03	17.07			
	Subtest 4	17.09	17.11	17.13	16.14	16.17	16.11			
	Subtest 5	19.08	19.19	19.11	18.15	18.03	17.96			

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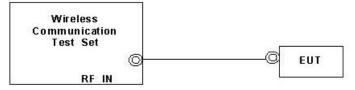
TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: HLZTMDMA501A Page Number : E1 of E7 Report Issued Date: Sep. 27, 2011

Report No.: FA132604-07

: Rev. 01 Report Version

# **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** 

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: HLZTMDMA501A Page Number : E2 of E7
Report Issued Date : Sep. 27, 2011
Report Version : Rev. 01

Report No.: FA132604-07

### **HSDPA Setup Configuration:**

a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.

Report No.: FA132604-07

- 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: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	βε	β <sub>d</sub>	β <sub>d</sub> (SF)	βε/βα	βнs (Note1, 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,  $\beta_h s/\beta_c$ =24/15. For all other combinations of DPDCH, DPCCH and HSDPCCH 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**

 SPORTON INTERNATIONAL INC.
 Page Number
 : E3 of E7

 TEL: 886-3-327-3456
 Report Issued Date
 : Sep. 27, 2011

 FAX: 886-3-328-4978
 Report Version
 : Rev. 01

FCC ID: HLZTMDMA501A

### **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

Report No.: FA132604-07

- 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 subtest's 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	βς	β <sub>d</sub>	β <sub>d</sub> (SF)	βc/βd	βнs (Note1)	βec	β <sub>ed</sub> (Note 5) (Note 6)	β <sub>ed</sub> (SF)	β <sub>ed</sub> (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	209/2 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 <sub>ed</sub> 1: 47/15 β <sub>ed</sub> 2: 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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI}$  = 30/15 with  $\beta_{hs}$  = 30/15 \*  $\beta_c$ .
- Note 2: CM = 1 for  $\beta_c/\beta_d$  =12/15,  $\beta_h s/\beta_c$ =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"

 SPORTON INTERNATIONAL INC.
 Page Number
 : E4 of E7

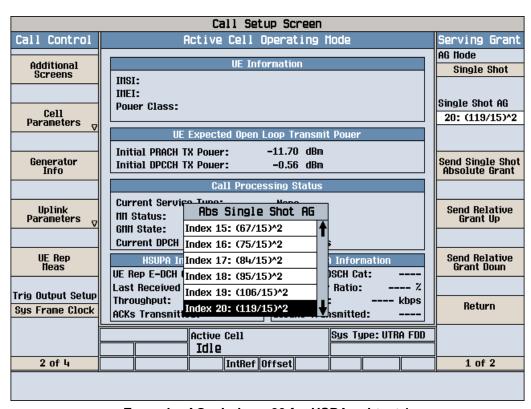
 TEL: 886-3-327-3456
 Report Issued Date
 : Sep. 27, 2011

 FAX: 886-3-328-4978
 Report Version
 : Rev. 01

FCC ID: HLZTMDMA501A

Call Setup Screen Call Control Active Cell Operating Mode Call Parms Cell Pouer **UE Information** Channel (UARFCN) Info -86.00 IHSI: dBm/3.84 HHz THET: Channel Type Pouer Class: Cell Parameters 12.2k + HSPA UE Expected Open Loop Transmit Power -11.70 dBm Paging Service Initial PRACH TX Pouer: Generator Info Initial DPCCH TX Pouer: -0.56 dBm **RB Test flode** Uplink Parameters Value PRACH Preambles Uplink Parameters HSPA Parameters PRACH Ramping Cycles(MMAX) 000000000001 Available Subchannels (Bit Mask) Uplink DPCH Scrambling Code UE Rep Neas 34.121 Preset Call Configs Uplink DPCH Bc/Bd Control Manual Manual Uplink DPCH Bc 11 Manual Uplink DPCH Bd 15 Close Henu Channel (UARFCN) Parms Maximum Uplink Transmit Pouer Level 21 dBm 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))

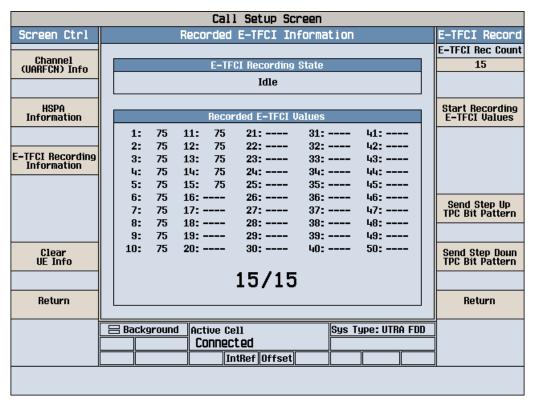


Example: AG - Index = 20 for HSPA subtest 1

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: HLZTMDMA501A Page Number : E5 of E7
Report Issued Date : Sep. 27, 2011
Report Version : Rev. 01

Report No.: FA132604-07



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

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: HLZTMDMA501A Page Number : E6 of E7
Report Issued Date : Sep. 27, 2011
Report Version : Rev. 01

Report No.: FA132604-07



#### Reference:

- 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**
- TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance [2.] Specification, Radio Transmission and Reception (FDD)
- [3.] HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18

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TEL: 886-3-327-3456 FAX: 886-3-328-4978 FCC ID: HLZTMDMA501A Page Number : E7 of E7 Report Issued Date: Sep. 27, 2011 Report Version

Report No.: FA132604-07

: Rev. 01