



## Appendix F - FCC 3G SAR Measurement Procedures

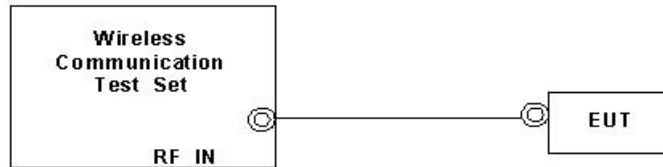
### Conducted Output Power:

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	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	21.86	21.75	21.98	22.50	22.12	21.85
R5-HSDPA	HSDPA - subtest 1	21.81	21.81	21.88	22.44	22.18	21.89
	HSDPA - subtest 2	21.37	21.33	21.34	22.01	21.70	21.35
	HSDPA - subtest 3	21.42	21.38	21.43	22.03	21.85	21.44
	HSDPA - subtest 4	20.93	20.87	20.84	21.61	21.53	20.94
R6- HSPA (HSUPA&HSDPA)	HSUPA - subtest 1	21.63	21.60	21.66	22.27	22.00	21.60
	HSUPA - subtest 2	19.67	19.57	19.77	20.23	19.94	19.79
	HSUPA - subtest 3	20.74	20.55	20.68	21.27	20.97	20.68
	HSUPA - subtest 4	19.63	19.53	19.67	20.28	19.94	19.78
	HSUPA - subtest 5	21.66	21.67	21.85	21.88	21.89	21.60

**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 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  $\beta_c/\beta_d$  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	209/225	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 (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
	Value		Paging Service
Uplink Parameters	PRACH Preambles	64	RB Test Mode
	PRACH Ramping Cycles (NMAX)	2	
UE Rep Params	Available Subchannels (Bit Mask)	000000000001	HSPA Parameters
	Uplink DPCH Scrambling Code	0	
Close Menu	Uplink DPCH Bc/Bd Control	Manual	34,121 Preset Call Configs
	Manual Uplink DPCH Bc	11	
2 of 4	Manual Uplink DPCH Bd	15	Channel (UARFCH) Parms
	Maximum Uplink Transmit Power Level	21 dBm	
Active Cell		Sys Type: UTRA FDD	
Idle			
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
	Current Service Type: Mode MM Status: GMM State: Current DPCH		Send Relative Grant Up
Uplink Parameters	HSUPA In UE Rep E-DCH Last Received Throughput: ACKs Transmit		Send Relative Grant Down
	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: $(119/15)^2$		Return
Trig Output Setup	Active Cell		Sys Type: UTRA FDD
	Idle		
Sys Frame Clock	IntRef		Offset
2 of 4			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