



Appendix F - FCC 3G SAR Measurement Procedures

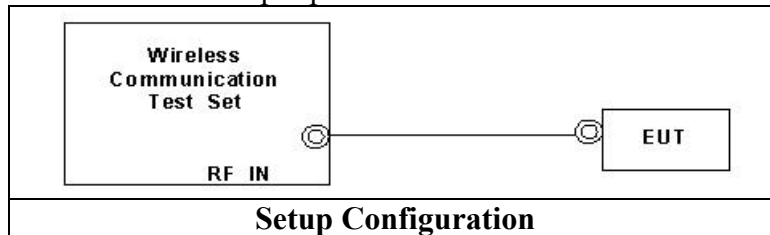
Conducted Output Power:

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 1/4 dB higher than the basic 12.2 kbps RMC configurations in WCDMA or maximum SAR value (0.035W/kg) in WCDMA mode is less than 75% of SAR limit.

Table with 8 columns: Mode, Setup, Cell band (850) [CH4132, CH4182, CH4233], PCS band (1900) [CH9262, CH9400, CH9538]. Rows include R99- WCDMA, R5-HSDPA (subtests 1-4), and R6- HSPA (HSUPA&HSDPA) (subtests 1-5).

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.



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 Δ_{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 Δ_{NACK} = 30/15 with $\beta_{HS} = 30/15 * \beta_c$, and Δ_{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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 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 Parm								
Channel (UARFCN) Info	<table border="1"> <thead> <tr> <th colspan="2">UE Information</th> </tr> </thead> <tbody> <tr> <td>INSI:</td> <td></td> </tr> <tr> <td>INEI:</td> <td></td> </tr> <tr> <td>Power Class:</td> <td></td> </tr> </tbody> </table>		UE Information		INSI:		INEI:		Power Class:		Cell Power -86.00 dBm/3.84 MHz
UE Information											
INSI:											
INEI:											
Power Class:											
Cell Parameters			Channel Type 12.2k + HSPA								
Generator Info	<table border="1"> <thead> <tr> <th colspan="2">UE Expected Open Loop Transmit Power</th> </tr> </thead> <tbody> <tr> <td>Initial PRACH TX Power:</td> <td>-11.70 dBm</td> </tr> <tr> <td>Initial DPCCH TX Power:</td> <td>-0.56 dBm</td> </tr> </tbody> </table>		UE Expected Open Loop Transmit Power		Initial PRACH TX Power:	-11.70 dBm	Initial DPCCH TX Power:	-0.56 dBm	Paging Service RB Test Mode		
UE Expected Open Loop Transmit Power											
Initial PRACH TX Power:	-11.70 dBm										
Initial DPCCH TX Power:	-0.56 dBm										
	Uplink Parameters	Value									
Uplink Parameters	PRACH Preambles	64	HSPA Parameters								
	PRACH Ramping Cycles (NMAX)	2									
	Available Subchannels (Bit Mask)	000000000001									
UE Rep Neas	Uplink DPCH Scrambling Code	0	34,121 Preset Call Configs								
	Uplink DPCH Bc/Bd Control	Manual									
	Manual Uplink DPCH Bc	11									
Close Menu	Manual Uplink DPCH Bd	15	Channel (UARFCN) Parm								
	Maximum Uplink Transmit Power 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 $\beta_d = 15$))

Call Setup Screen																					
Call Control	Active Cell Operating Mode		Serving Grant																		
Additional Screens	<table border="1"> <thead> <tr> <th colspan="2">UE Information</th> </tr> </thead> <tbody> <tr> <td>INSI:</td> <td></td> </tr> <tr> <td>INEI:</td> <td></td> </tr> <tr> <td>Power Class:</td> <td></td> </tr> </tbody> </table>		UE Information		INSI:		INEI:		Power Class:		AG Mode Single Shot										
UE Information																					
INSI:																					
INEI:																					
Power Class:																					
Cell Parameters			Single Shot AG 20: (119/15)^2																		
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Initial DPCCH TX Power:	-0.56 dBm																				
	<table border="1"> <thead> <tr> <th colspan="2">Call Processing Status</th> </tr> </thead> <tbody> <tr> <td>Current Service Type:</td> <td>None</td> </tr> <tr> <td>MM Status:</td> <td>Abs Single Shot AG</td> </tr> <tr> <td>GM 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 Throughput:</td> <td>Index 19: (106/15)^2</td> </tr> <tr> <td>ACKs Transmitted:</td> <td>Index 20: (119/15)^2</td> </tr> </tbody> </table>		Call Processing Status		Current Service Type:	None	MM Status:	Abs Single Shot AG	GM 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 Throughput:	Index 19: (106/15)^2	ACKs Transmitted:	Index 20: (119/15)^2	Send Relative Grant Up
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UE Rep Neas																					
Trig Output Setup			Return																		
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	<table border="1"> <thead> <tr> <th colspan="7">E-TFCI Recording State</th> </tr> <tr> <td colspan="7">Idle</td> </tr> </thead> </table>	E-TFCI Recording State							Idle							E-TFCI Rec Count																																																															
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Return		Return																																																																													
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	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