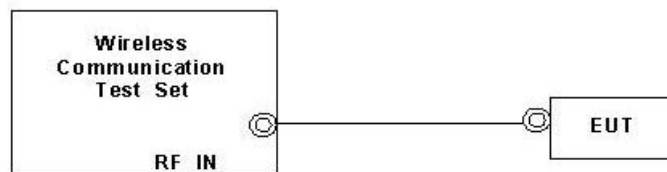


## Appendix F. FCC 3G SAR Measurement Procedures

### HSPA+ 3GPP release 7 (uplink category 7) 16QAM, 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 HSPA
  - ii. RMC Test Loop = Loop Mode 1
  - iii. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.



Setup Configuration

**HSPA+ 3GPP release 7 (uplink category 7) 16QAM, 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 = 5.2E:HSPA+:UL with 16QAM
  - 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, C11.1.4, quoted from the TS 34.121-1 s5.2E
  - iii. Set Channel Params
  - iv. Set Cell Power = -86 dBm
  - v. Set Channel Type = HSPA
  - vi. Set UE Target Power =21 dBm
  - vii. Power Ctrl Mode= All Up Bits
  - viii. Set Manual Uplink DPCH Bc/Bd = Manual
  - ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 tableC11.1.4 sub-test 1)
  - x. Set HSPA Conn DL Channel Levels
  - xi. Set HS-SCCH Configs
  - xii. Set RB Test Mode Setup
  - xiii. Set Common HSUPA Parameters
  - xiv. Set Serving Grant
  - xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

**Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	$\beta_c$ (Note 3)	$\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the  $\beta_c$  is set to 1 and  $\beta_d = 0$  by default.

Note 4:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

**Setup Configuration**
**Note:**

For details settings in the Agilent 8960 test equipment, please refer to the user guide "16QAM Measurement User Guide rev2"

Call Setup Screen									
Call Control	Active Cell Operating Mode						Call Parm		
Channel (UARFCN) Info	UE Information						Cell Power		
	INSI: 001010123456789			Power Class: 3			-75.00		
Cell Info	IMEI(SV):355791040039823 (--)			Detected PRACH Sig: 0			dBm/3.84 MHz		
	Called Party Number:						Channel Type		
Generator Info	UE Expected Open Loop Transmit Power						HSPA		
	Init PRACH TX Pou: -22.70 dBm			Init DPCH TX Pou: 17.99 dBm			Paging Service		
Uplink Parameters	Current Service Type						RB Test Mode		
	None								
Close Menu	Uplink Parameters			Value					
	PRACH Ramping Cycles(MMAX)			2			HSPA Parameters		
	Available Subchannels (Bit Mask)			000000000001			34,121 Preset Call Configs		
	Uplink DPCH Scrambling Code			0					
	Uplink DPCH Bc/Bd Control			Manual					
	Manual Uplink DPCH Bc			15					
	Manual Uplink DPCH Bd			15					
	Maximum Uplink Transmit Power Level			21 dBm			Channel (UARFCN) Parm		
	Uplink DPCH Slot Format			1					
	Background			Active Cell Idle			Sys Type: UTRA FDD		
2 of 6							Logging: No Conn		
	IntRef			Offset			1 of 3		

Example for HSPA+ Subtest 1, and other subtests following table, C11.1.4  
(Gain Factors ( $\beta_c = 15$  and  $\beta_d = 15$ ))

Call Setup Screen									
Conn DL Lvl	Generator Information						Call Parm		
Additional Gen Info Screens	Primary Scrambling Code: 0						Cell Power		
	Channel			Cell 1 DL Code Chan Info			Cell 2 DL Code Chan Info		
HSDPA Conn DL Channel Levels	Level (dB)			Level (dB)			dBm/3.84 MHz		
	Current Desired QVSF			Chan Code			Chan Code		
HSDPA Conn DL Channel Levels	CPICH: -3.30 -3.30 256 0			Off -3.30 256 0			Channel Type		
	P-CCPCH/SCH: -5.30 -5.30 256 1			Off -5.35 256 1			HSPA		
HSDPA Conn DL Channel Levels	S-CCPCH: -10.30 -10.30 64 7						Paging Service		
	PICH: -8.30 -8.30 256 16						RB Test Mode		
HSDPA Conn DL Channel Levels	RGCH: -9.90 -9.90 256 10								
	HSPA Connected DL Channel Levels						Value		
HSPA Conn DL Channel Levels	HSPA Cell 1 Connected CPICH Level						-10.00 dB		
	HSPA Cell 1 Connected P-CCPCH/SCH Level						-12.00 dB		
AUGN Power	HSPA Cell 1 Connected S-CCPCH Level						Off		
	HSPA Cell 1 Connected PICH Level						-15.00 dB		
Off	HSPA Cell 1 Connected (F-)DPCH Level						-10.00 dB		
	HSPA Cell 1 Connected E-AGCH Level						-20.00 dB		
Close Menu	HSPA Cell 1 Connected E-HICH Level						-20.00 dB		
	HSPA Cell 1 Connected E-RGCH Level						Off		
	Background			Active Cell Idle			Sys Type: UTRA FDD		
							Logging: No Conn		
	IntRef			Offset			1 of 3		

Set HSPA Conn DL Channel Levels : CPICH =10dBm , P-CCPCH/SCH=-12dBm , PICH=15 ,  
(F-)DPCH=-10 , E-AGCH=-20 , E-HICH=-20 , E-RGCH=off , HS-PDSCHs=-3dBm , HS-SCCH 1=-8dBm

Call Setup Screen									
DL Config	Generator Information							Call Params	
Additional Gen Info Screens	Primary Scrambling Code: 0							Cell Power	
	Channel	Cell 1 DL Code Chan Info			Cell 2 DL Code Chan Info			-75.00	
Conn S-CCPCH Cfg	Channel	Level (dB)			Level (dB)			dBm/3.84 MHz	
	Current Desired OVSF Chan Code							Channel Type	
On	CPICH:	-3.30	-3.30	256	0	Off	-3.30	256	0
HS-SCCH Configs	P-CCPCH/SCH:	-5.30	-5.30	256	1	Off	-5.35	256	1
	S-CCPCH:	-10.30	-10.30	64	7				
	PICH:	-8.30	-8.30	256	16				
	ATICH:	-9.90	-9.90	256	10				
HSDPA/HSPA OCHS Configs	HS-SCCH Conf States							Value	
	HS-SCCH 1 Channel Config State							On	
	HS-SCCH 2 Channel Config State							Off	
	HS-SCCH 3 Channel Config State							Off	
	HS-SCCH 4 Channel Config State							Off	
DL Chan Code Preset Configs								34.121 Preset Call Configs	
Close Menu								Channel (UARFCN) Params	
	Background		Active Cell			Sys Type: UTRA FDD			1 of 3
			Idle			Logging: No Conn			
				IntRef	Offset				

Set HS-SCCH Configs : HS-SCCH 2=off , HS-SCCH 3=off , HS-SCCH 4=off

Call Setup Screen										
Call Control	Active Cell Operating Mode							HSUPA Params		
	UE Information							HSUPA PS Data Setup		
	IMSI: 001010123456789			Power Class: 3						
	IMEI(SV):355791040039823(--)			Detected PRACH Sig: 0						
	Called Party Number:							HSUPA RB Test Mode Setup		
	UE Expected Open Loop Transmit Power									
	Init PRACH TX Pou: -22.70 dBm			Init DPCH TX Pou: 17.99 dBm						
	Current Service Type							Common HSUPA Parameters		
	None									
	HSUPA RB Test Mode Settings							Value		
	Close Menu	RB Test Mode E-RGCH Information State							Off	
RB E-DPDCH Max Channel Codes (12.2k + HSPA)							2SF4			
RB E-DPDCH Max Channel Codes (HSPA)							2SF2 + 2SF4			
E-DCH RLC SDU Size							8808			
RB Max Number of HARQ Retransmissions							7			
								Serving Grant		
								E-TFCI Recording		
								Return		
	Background		Active Cell			Sys Type: UTRA FDD			1 of 2	
			Idle			Logging: No Conn				
				IntRef	Offset					

Set RB Test Mode Setup : E-RGCH Information State to Off , Set RB E-DPDCH Max Channel Codes (HSPA) to 2SF2 + 2SF4 , Set E-DCH RLC SDU Size to 8808

Call Setup Screen									
Call Control	Active Cell Operating Mode						HSUPA Parm		
Close Menu	<b>UE Information</b> INSI: 001010123456789 Power Class: 3 IMEI(SV):355791040039823 (--) Detected PRACH Sig: 0 Called Party Number: <b>UE Expected Open Loop Transmit Power</b> Init PRACH TX Pou: -22.70 dBm Init DPCCH TX Pou: 17.99 dBm <b>Current Service Type</b> None						HSUPA PS Data Setup HSUPA RB Test Mode Setup Common HSUPA Parameters		
	<b>HSUPA Common Service Parameters</b>						Value		
	E-DCH TTI						2 ms		
	E-DCH 16QAM State						On		
	E-DPCCH/DPCCH Power Offset (DeltaE-DPCCH)						8		
	Happy Bit Delay Condition						100 ms		
	Happy Bit Averaging Period						1.000 s		
	E-TFCI Table Index (10 ms TTI)						0		
	E-TFCI Table Index (2 ms TTI)						0		
	E-TFCI Table Index (2 ms TTI with 16QAM)						2		
	Background Active Cell Idle						Sys Type: UTRA FDD Logging: No Conn		
	IntRef Offset						1 of 2		

Set Common HSUPA Parameters : E-DCH TTI to 2 ms , E-DCH 16QAM State to On , E-DPCCH/DPCCH Power Offset (DeltaE-DPCCH)=8 , E-TFCI Table Index=2ms

Call Setup Screen									
Call Control	Active Cell Operating Mode						HSUPA Parm		
Close Menu	<b>UE Information</b> INSI: 001010123456789 Power Class: 3 IMEI(SV):355791040039823 (--) Detected PRACH Sig: 0 Called Party Number: <b>UE Expected Open Loop Transmit Power</b> Init PRACH TX Pou: -22.70 dBm Init DPCCH TX Pou: 17.99 dBm <b>Current Service Type</b> None						HSUPA PS Data Setup HSUPA RB Test Mode Setup Common HSUPA Parameters		
	<b>HSUPA Common Service Parameters</b>						Value		
	E-DCH Minimum Set E-TFCI Information State						On		
	E-DCH Minimum Set E-TFCI (10ms TTI)						9		
	E-DCH Minimum Set E-TFCI (2ms TTI)						10		
	Reference E-TFCI Power Offset Control						Predefined		
	Reference E-TFCI Power Offsets						Def 34.121-04		
	Scheduling Information Periodicity (No Grant)						No Report		
	Scheduling Information Periodicity (Grant)						No Report		
	E-HICH Behavior						Active		
	Background Active Cell Idle						Sys Type: UTRA FDD Logging: No Conn		
	IntRef Offset						1 of 2		

Set Common HSUPA Parameters : Reference E-TFCI Power Offset Control to Predefined  
Reference E-TFCI Power Offsets to Definition 34.121-04

Call Setup Screen										
Call Control	Active Cell Operating Mode						HSUPA Parms			
	<div>UE Information</div> <div> <div>INSI: 001010123456789</div> <div>Power Class: 3</div> </div> <div> <div>IMEI(SV):355791040039823 (--)</div> <div>Detected PRACH Sig: 0</div> </div> <div>Called Party Number:</div>						<div>HSUPA PS Data Setup</div> <div>HSUPA RB Test Mode Setup</div> <div>Common HSUPA Parameters</div>			
	<div>UE Expected Open Loop Transmit Power</div> <div> <div>Init PRACH TX Pou: -22.70 dBm</div> <div>Init DPCH TX Pou: 17.99 dBm</div> </div>									
	<div>Current Service Type</div> <div>None</div>									
	<div>HSUPA Common Service Parameters</div> <div>Value</div>									
	Scheduling Information Periodicity (Grant)						No Report			
	E-HICH Behavior						Active			
	SRB Mac-d Flow Transmission Grant						Non Scheduled			
	E-TFCI Boost Information State						On			
	E-TFCI Boost Value						105			
	DeltaT2TP						2			
	BetaEd Gain E-AGCH Table Selection						1			
	E-DPDCH Power Calculation Formula						Extrapolation			
	Close Menu	Background		Active Cell		Sys Type: UTRA FDD				
				Idle		Logging: No Conn				
		IntRef Offset				1 of 2				

Set Common HSUPA Parameters : E-TFCI Boost Information State to On ,  
 E-TFCI Boost Value to 105 , DeltaT2TP to 2 ,  
 BetaEd Gain E-AGCH Table Selection to 1  
 E-DPDCH Power Calculation Formula to Extrapolation

Call Setup Screen										
Call Control	Active Cell Operating Mode						Serving Grant			
	<div>Operating Mode</div> <div>Active Cell</div>						AG Mode			
	<div>UE Information</div> <div> <div>INSI: 001010123456789</div> <div>Power Class: 3</div> </div> <div> <div>IMEI(SV):355791040039823 (--)</div> <div>Detected PRACH Sig: 0</div> </div> <div>Called Party Number:</div>						<div>Single Shot</div> <div>Single Shot AG</div> <div>14: (75/15)*2</div>			
	<div>UE Expected Open Loop Transmit Power</div> <div> <div>Init PRACH TX Pou: -11.70 dBm</div> <div>Init DPCH TX Pou: -0.01 dBm</div> </div>									
	<div>Current Service Type</div> <div>None</div>						<div>Send Single Shot Absolute Grant</div> <div>RB Setup AG</div> <div>17: (75/15)*2</div>			
	<div>Call Processing Status</div> <div>Absolute Grant Mode</div> <div> <div>RRC State:</div> <div>MM Status:</div> <div>GM State:</div> </div> <div> <div>Single Shot</div> <div>Pattern</div> </div>						<div> <div>Power State: Off</div> <div>Mode State: Off</div> <div>Offset: 0 chips</div> </div> <div>AG Pattern Parameters</div>			
	<div>Handovers</div> <div> <div>HSUPA In</div> <div>Rep EDCH Cat/</div> <div>Last Happy Bit</div> <div>Throughput:</div> <div>ACKs Transmitt</div> </div>						<div> <div>OSCH Cat: 14</div> <div>Ratio: 0 %</div> <div>533 kbps</div> <div>Transmitted: 11000</div> </div> <div>Return</div>			
	Clear UE Info	Background		Active Cell		Sys Type: UTRA FDD				
				Idle		Logging: No Conn				
				IntRef Offset				1 of 2		

Set Serving Grant : AG Mode= Single Shot , Set RB Setup AG=74(75/15)

Call Setup Screen									
Screen Ctrl	Recorded E-TFCI Information					E-TFCI Record			
Channel (UARFCN) Info	<div>E-TFCI Recording State</div> <div>Idle</div>					<div>E-TFCI Recording Parameters</div> <div>▼</div>			
HSPA Information	<div>Current E-TFCI Boost</div> <div>105</div>					<div>Start Recording E-TFCI Values</div>			
E-TFCI Recording Information	<div>Recorded E-TFCI Values</div> <div> 1:---- 11:---- 21:---- 31:---- 41:----  2:---- 12:---- 22:---- 32:---- 42:----  3:---- 13:---- 23:---- 33:---- 43:----  4:---- 14:---- 24:---- 34:---- 44:----  5:---- 15:---- 25:---- 35:---- 45:----  6:---- 16:---- 26:---- 36:---- 46:----  7:---- 17:---- 27:---- 37:---- 47:----  8:---- 18:---- 28:---- 38:---- 48:----  9:---- 19:---- 29:---- 39:---- 49:----  10:---- 20:---- 30:---- 40:---- 50:---- </div>					<div>Send Step Up TPC Bit Pattern</div>			
Clear UE Info						<div>Send Step Down TPC Bit Pattern</div>			
Return	<div>0/15</div>					<div>Return</div>			
		<div>Background</div>		<div>Active Cell</div> <div>Idle</div>		<div>Sys Type: UTRA FDD</div>			
				<div>IntRef</div> <div>Offset</div>		<div>Logging: No Conn</div>			

Example: Confirm that E-TFCI is equal to the target E-TFCI of 105 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