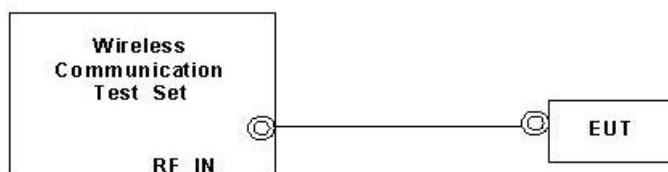## *Appendix F.   FCC 3G SAR Measurement Procedures*

Conducted Output Power:

The EUT was tested according to the requirements of the FCC 3G procedures and the TS 34.121. The EUT's WCDMA and HSPA function is Release 6 version supporting HSDPA Category 10, 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.

WCDMA SAR Test mode - Conducted Power				
		PCS band (1900)		
Mode	**Setup**	**CH9262**	**CH9400**	**CH9538**
		1852.4 (MHz)	**1880.0 (MHz)**	**1907.6 (MHz)**
WCDMA	**RMC 12.2Kbps**	23.40	23.56	23.18
HSDPA	**Subtest 1**	22.96	23.14	22.64
	Subtest 2	22.99	23.16	22.62
	Subtest 3	22.48	22.68	22.25
	Subtest 4	22.47	22.63	22.35
HSUPA	**Subtest 1**	23.10	23.11	22.74
	Subtest 2	21.55	21.70	21.28
	Subtest 3	22.10	21.91	21.44
	Subtest 4	21.65	21.63	21.25
	Subtest 5	22.50	22.81	22.54

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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.

```
┌─────────────────┐
│   Wireless      │
│ Communication   │
│   Test Set      │
│                 │
│              ○──┼──────────○─┐ ┌──────┐
│          RF IN  │            │ │ EUT  │
└─────────────────┘            └─┴──────┘
```

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 (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} (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: 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 β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, 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 β_c = 11/15 and β_d = 15/15.

Setup Configuration

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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 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	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	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	209/225	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	β_{ed}1: 47/15 β_{ed}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: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 10/15 and β_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 β_c = 14/15 and β_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"

Example for HSPA Subtest 1, and other subtests following table, C11.1.3
(Gain Factors (β_c = 11 and β_d = 15))

Example: AG – Index = 20 for HSPA subtest 1

```
                        Call Setup Screen
 Screen Ctrl          Recorded E-TFCI Information       E-TFCI Record
                                                       E-TFCI Rec Count
   Channel                E-TFCI Recording State             15
 (UARFCN) Info
                                 Idle
                                                       Start Recording
    HSPA                                                 E-TFCI Values
 Information              Recorded E-TFCI Values
                   1:  75  11:   75  21: ----  31: ----  41: ----
                   2:  75  12:   75  22: ----  32: ----  42: ----
E-TFCI Recording   3:  75  13:   75  23: ----  33: ----  43: ----
  Information       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: ----
                                                       Send Step Up
                   8:  75  18: ----  28: ----  38: ----  48: ----  TPC Bit Pattern
                   9:  75  19: ----  29: ----  39: ----  49: ----
    Clear         10:  75  20: ----  30: ----  40: ----  50: ----
   UE Info                                              Send Step Down
                                 15/15                  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