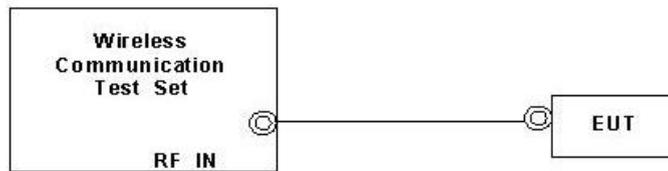## *Appendix F.　FCC WCDMA SAR Measurement Procedures*

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 8, and HSUPA Category 6. 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							
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)**
WCDMA	**RMC 12.2Kbps**	22.02	22.06	21.96	22.02	22.10	21.71
HSDPA	**Subtest 1**	21.86	21.87	21.74	22.08	22.27	21.85
	Subtest 2	21.60	21.75	21.55	21.85	22.20	21.75
	Subtest 3	21.64	21.65	21.57	21.85	22.10	21.67
	Subtest 4	21.46	21.68	21.48	21.86	21.90	21.50
HSUPA	**Subtest 1**	21.25	21.27	21.25	21.83	21.13	21.21
	Subtest 2	20.65	20.70	20.65	20.35	20.66	20.35
	Subtest 3	20.46	20.49	20.42	20.48	20.62	20.51
	Subtest 4	20.65	20.59	20.55	20.50	20.86	20.15
	Subtest 5	21.52	21.34	21.26	21.60	21.70	21.37

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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       |              |        |
|                  (O)-------------(O)|  EUT   |
|                     |              |        |
|           RF  IN    |              +--------+
+---------------------+
```

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 β_{hs} = 30/15 * β_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 β_{hs} = 30/15 * β_c , and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_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"

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```
                    Call Setup Screen
Call Control    |   Active Cell Operating Mode    |  Call Parms
                |                                 | Cell Power
  Channel       |          UE Information         |   -86.00
(UARFCN) Info   |  IMSI:                          | dBm/3.84 MHz
                |  IMEI:                           | Channel Type
   Cell         |  Power Class:                   |  12.2k + HSPA
 Parameters  ▽  |                                 |
                |  UE Expected Open Loop Transmit Power |
                |  Initial PRACH TX Power:  -11.70 dBm  | Paging Service
 Generator      |  Initial DPCCH TX Power:   -0.56 dBm  |  RB Test Mode
   Info         |                                 |
                |    Uplink Parameters    |  Value |
  Uplink        | PRACH Preambles         |   64   |   HSPA
Parameters   ▽  | PRACH Ramping Cycles(MMAX) |  2  |  Parameters
                | Available Subchannels (Bit Mask) | 000000000001 |
  UE Rep        | Uplink DPCH Scrambling Code |  0  | 34.121 Preset
  Meas          | Uplink DPCH Bc/Bd Control |  Manual | Call Configs ▽
                | Manual Uplink DPCH Bc    |   11   |
                | Manual Uplink DPCH Bd    |   15   |  Channel
  Close         | Maximum Uplink Transmit Power Level | 21 dBm | (UARFCN) Parms
  Menu          |                                 |
                |        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
                |                                 | AG Mode
  Additional    |          UE Information         |  Single Shot
  Screens       |  IMSI:                          |
                |  IMEI:                          | Single Shot AG
   Cell         |  Power Class:                   |  20: (119/15)^2
 Parameters  ▽  |                                 |
                |  UE Expected Open Loop Transmit Power |
                |  Initial PRACH TX Power:  -11.70 dBm  |
 Generator      |  Initial DPCCH TX Power:   -0.56 dBm  | Send Single Shot
   Info         |                                 | Absolute Grant
                |       Call Processing Status    |
  Uplink        | Current Service Type:    None   | Send Relative
Parameters   ▽  | MM Status:   | Abs Single Shot AG |  Grant Up
                | GMM State:   | Index 15: (67/15)^2 |
  UE Rep        | Current DPCH | Index 16: (75/15)^2 |
  Meas          |    HSUPA In  | Index 17: (84/15)^2 | Send Relative
                | UE Rep E-DCH | Index 18: (95/15)^2 |  Grant Down
Trig Output Setup| Last Received| Index 19: (106/15)^2 |
 Sys Frame Clock | Throughput:  | Index 20: (119/15)^2 |  Return
                | ACKs Transmitt|                   |
                |        Active Cell | Sys Type: UTRA FDD |
                |           Idle     |                  |
   2 of 4       |        IntRef Offset |             |   1 of 2
```

Example: AG – Index = 20 for HSPA subtest 1

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Call Setup Screen		
Screen Ctrl	**Recorded E-TFCI Information**	**E-TFCI Record**

Screen Ctrl
- Channel (UARFCN) Info
- HSPA Information
- E-TFCI Recording Information
- Clear UE Info
- Return

Recorded E-TFCI Information

E-TFCI Recording State

Idle

Recorded E-TFCI Values

1: 75	11: 75	21: ----	31: ----	41: ----
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: ----

15/15

E-TFCI Record
- E-TFCI Rec Count: 15
- Start Recording E-TFCI Values
- Send Step Up TPC Bit Pattern
- Send Step Down TPC Bit Pattern
- Return

Background | Active Cell **Connected** | Sys Type: UTRA FDD
IntRef | Offset

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

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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

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