



Test report No. : 32BE0278-HO-Q-R4
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FCC ID : A3LGTP6200L
Issued date : October 18, 2011
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SAR TEST REPORT

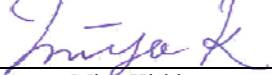
Test Report No. : 32BE0278-HO-Q-R4


Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : Cellular/PCS GSM/GPRS/EDGE, Cellular /PCS WCDMA
Tablet with 802.11abgn, BT3.0
Model No. : GT-P6200L
FCC ID : A3LGTP6200L
Test regulation : FCC47CFR 2.1093
FCC OET Bulletin 65, Supplement C (Edition 01-01)

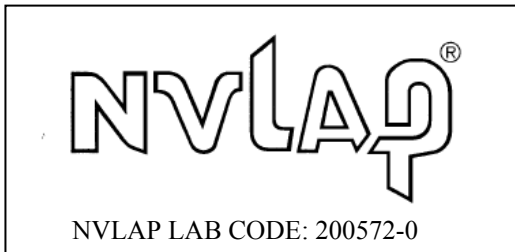
Test Result : **Complied**
FCC Part 22H Head : 0.491W/kg
Body : 0.767W/kg
FCC Part 24E Head : 0.614W/kg
Body: : 1.09W/kg

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
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6. This report is a revised version of 32BE0278-HO-Q. 32BE0278-HO-Q is replaced with this report.

Date of test: October 3 to 5, November 7 , 2011

Representative test engineer: 
Miyō Kishimoto
Engineer of WiSE Japan,
UL Verification Service

Approved by : 
Mitsuru Fujimura
Leader of WiSE Japan
UL Verification Service



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SECTION 1: Customer information

Company Name	SAMSUNG ELECTRONICS CO., LTD.
Address	416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of EUT	Cellular/PCS GSM/GPRS/EDGE, Cellular/PCS WCDMA Tablet with 802.11abgn, BT3.0
Model No.	GT-P6200L
Serial No.	358877/04/000455/7 358877/04/000457/3
Rating	DC 4.0V
Option Battery	N/A
Receipt Date of Sample	September 27, 2011
Modification of EUT	No Modification by the test lab
Device category	Portable
Antenna to antenna separation distance	108.2mm from WWAN antenna to WLAN antenna 57.35mm from WWAN antenna to BT antenna 138mm from WLAN antenna to Bluetooth antenna
Simultaneous transmission	WWAN can transmit simultaneously with WLAN WWAN can transmit simultaneously with Bluetooth WLAN can transmit simultaneously with Bluetooth
Size of EUT	19.36cm x 12.235cm (Diagonal dimension :22cm)

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2.2 Product description**Radio Specification****Bluetooth**

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	PIFA
Antenna Gain	-0.63 dBi

WLAN (IEEE802.11a/b/g/n-20)

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5700MHz 5745-5825MHz
Type of Modulation	DSSS, OFDM	OFDM
Bandwidth & Channel spacing	20MHz & 5MHz	20MHz & 20MHz
Antenna Type	SEMI-PIFA	
Antenna Gain	2.4G: -2.85dBi	5G: -4.15dBi

WLAN (IEEE802.11n-40)

Equipment Type	Transceiver
Frequency of Operation	5190-5230MHz 5270-5310MHz 5510-5670MHz 5755-5795MHz
Type of Modulation	OFDM
Bandwidth & Channel spacing	40MHz & 40MHz
Antenna Type	SEMI-PIFA
Antenna Gain	-4.15dBi

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GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK , 8PSK
Antenna Type	PIFA
Antenna Gain	GSM850: -5.86dBi PCS: -4.02dBi

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz Band II: 1850 – 1910MHz [Down Link] Band V: 869 – 894MHz Band II: 1930 – 1990MHz
Type of Modulation	QPSK
Antenna Type	PIFA
Antenna Gain	Band V: -5.86dBi Band II: -4.02dBi

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SECTION 3 : Test standard information

3.1 Test Specification

Title : **Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01):**

Supplement C (Edition 01-01) - Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions
OET Bulletin 65 (Edition 97-01) - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

: **IEEE Std 1528-2003:**

IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques Supplement C

In additions;

KDB447498D01(v04): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

KDB648474D01: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas

KDB941225D01(v02): SAR Measurement Procedures for 3G Devices

KDB941225D02(v02v01): 3GPP R6 HSPA and R7 HSPA+ SAR Guidance

KDB941225D03(v01): Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE

KDB941225D04(v01): Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode

KDB248227(rev.1.2): SAR Measurement Procedures for 802.11a/b/g Transmitters

KDB865664: SAR Measurement Requirements for 3 to 6 GHz

<Reference>

KDB94122506(v01): SAR test procedures for devices incorporating SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities (Hot Spot SAR)

Reference

[1]ANSI, ANSI/IEEE C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.

[2]SPEAG uncertainty document (AN 15-7/AN19-17) for DASY 5 System from SPEAG (Shimid & Partner Engineering AG).

3.2 Procedure

Transmitter	WWAN	WLAN	Bluetooth
Test Procedure	FCC OET BULLETIN 65, SUPPLEMENT C	FCC OET BULLETIN 65, SUPPLEMENT C	Exemption (Power < 12mW)
	SAR	SAR	
Category	FCC47CFR 2.1093	FCC47CFR 2.1093	FCC47CFR 2.1093
Note: UL Japan, Inc. 's SAR Work Procedures 13-EM-W0429 and 13-EM-W0430			

Bluetooth mode is excluded from SAR test since power was $1/2 * 60/f_{[GHz]}$ [mW].

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3.3 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

<p>NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE SPATIAL PEAK(averaged over any 1g of tissue) LIMIT 1.6 W/kg</p>

3.4 Test Location

*Shielded room for SAR testings

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SECTION 4 : Test result**4.1 Stand-alone SAR result**

No.	Capable Tx configurations		Head SAR	Body SAR	Hot Spot SAR* ¹	Note
1	WWAN	GSM/GPRS/EGPRS 850 MHz	Yes	Yes	Reference only	withVOIP
2		GSM/GPRS/EGPRS 1900 MHz	Yes	Yes	Reference only	withVOIP
3		WCDMA/HSPA Band V	Yes	Yes	Reference only	withVOIP
4		WCDMA/HSPA Band II	Yes	Yes	Reference only	withVOIP
5	WLAN	WLAN 2.4G	Yes	Yes	Reference only	withVOIP
6		WLAN 5G	Yes	Yes	-	withVOIP
7	Bluetooth	Bluetooth BDR/EDR	Exemption	Exemption	-	-

Note*¹:

Hotspot DATA;(body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

Although the hotspot mode is supported, the test was performed for reference only

Mode	1g Head SAR [W/kg]	1g BodySAR [W/kg]
GSM850	0.491	0.746
PCS1900	0.519	0.986
W-CDMA Band V	0.432	0.767
W-CDMA Band II	0.614	1.09
WLAN 11b/g/n(2.4G)	0.057	0.890
WLAN 11a/n(5G) 15.247	0.073	0.660
WLAN 11a/n(5G) 15.407	0.048	0.678
Bluetooth	Exemption	Exemption

4.2 Simultaneous transmission SAR result**<Simultaneous Procedure>**

This EUT has the unlicensed transmitter such as WLAN (802.11b/g/n) & Bluetooth devices besides licensed transmitter WWAN (GSM/WCDMA), and the following simultaneous transmission is possible.

No.	Capable Tx configurations		Head SAR	Body SAR	Hot Spot SAR* ²	Note
8	WWAN+WLAN	GSM + WLAN2.4G	Yes	Yes	-	-
9		GPRS/EGPRS + WLAN2.4G	Yes	Yes	Exemption	-
10		WCDMA/HSPA + WLAN2.4G	Yes	Yes	Exemption	-
11		GSM + WLAN 5G	Yes	Yes	-	-
12		GPRS/EGPRS + WLAN 5G	Yes	Yes	-	-
13		WCDMA/HSPA + WLAN 5G	Yes	Yes	-	-
14	WWAN+Bluetooth		Exemption	Exemption	-	-
15	WLAN+Bluetooth		Exemption	Exemption	-	-

Note*²: *Hotspot DATA;(body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.*

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<WWAN + WLAN >

Simultaneous transmitter evaluation based on the KDB648474. Refer to the Section 8.

Step1	WWAN antenna is >5cm from Wireless LAN antenna	
Step2	WLAN power > 2Pref (=60/f _[GHz]).	
Step3	Stand-alone SAR for WLAN	
Step4	Simultaneous transmission is possible (WWAN + WLAN)	
Step5	$\Sigma 1g$ SAR (WWAN + WLAN) < 1.6W/kg	$\Sigma 1g$ SAR(WWAN + WLAN) >1.6W/kg Max. SAR Measured (WWAN + WLAN) :1.657 W/kg
Step6	No simultaneous transmission.	Antenna pair SAR to peak SAR separation ratio<0.3 $\Sigma 1g$ SAR(WWAN + WLAN) / 13.06 cm : 0.127
Step7	No simultaneous transmission SAR	

<WWAN + Bluetooth >

Simultaneous transmitter evaluation based on the KDB648474.

Step1	WWAN antenna is >5cm from Bluetooth antenna	
Step2	Bluetooth power < 2Pref (=60/f _[GHz]). Refer to the FCC 15.247 test report	
Step3	No stand-alone SAR for Bluetooth	
Step4	No simultaneous transmission SAR	

<WLAN + Bluetooth >

Simultaneous transmitter evaluation based on the KDB648474.

Step1	WLAN antenna is >5cm from Bluetooth antenna	
Step2	Bluetooth power < 2Pref (=60/f _[GHz]). Refer to the FCC 15.247 test report	
Step3	No stand-alone SAR for Bluetooth	
Step4	No simultaneous transmission SAR	

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SECTION 5 : Description of the operating mode

5.1 SAR testing operating modes

The operating mode for SAR testing was decided by the output power

5.2 Output power operating modes

Band	Duty cycle or Multi class(GSM)	Test Frequency	Mode
GSM850	Multi class 33	824.2MHz (128ch) 836.6MHz(190ch) 848.8MHz(251ch)	GSM GPRS (CS-1) EGPRS (MCS1/MCS5)
PCS1900	Multi class 33	1850.2MHz(512ch) 1880.0MHz(661ch) 1909.8MHz(810ch)	
WCDMA V	100%	826.4MHz (4132ch) 836.6MHz(4183ch) 846.6MHz(4233ch)	AMR 12.2k RMC HSDPA HSUPA
WCDMA II	100%	1852.4MHz(9262ch) 1880.0MHz(9400ch) 1907.6MHz(9538ch)	
WWAN			
The communication link was set up with the Wireless Communications Test Set (Agilent). The EUT was command to operate at maximum transmit power. GSM850 :PCL 5 PCS1900 :PCL 0 W-CDMA :All up bits			

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5.3 Power reduction implementation

This EUT has a proximity sensor (IR sensor) and two grip sensors for power reduction.

The measurements for output power were performed in normal power mode and power reduction mode. Power reduction values are those values implemented when either proximity sensor and grip sensor are triggered. Power reduction values are same in three sensors.

Mode	Nominal		With power reduction		Power reduction	
	Target [dBm]	Tolerance [dB]	Target [dBm]	Tolerance [dB]	Target [dBm]	Tolerance [dB]
GSM850 GSM/GPRS/EGPRS	32	-1.5 ~ +0.5	26	-1.5 ~ +0.5	6	-2.0 ~ +2.0
PCS1900 GSM/GPRS/EGPRS	29	-1.5 ~ +0.5	22.5	-1.5 ~ +0.5	6.5	-2.0 ~ +2.0
WCDMA band V AMR/12.2k RMC /HSDPA/HSUPA	22.5	-1.5 ~ +0.5	17.5	-1.5 ~ +0.5	5	-2.0 ~ +2.0
WCDMA band II AMR/12.2k RMC /HSDPA/HSUPA	21.5	-1.5 ~ +0.5	13.5	-1.5 ~ +0.5	8	-2.0 ~ +2.0
WLAN 11b/g/n	Power reduction is not implemented for WLAN					
WLAN 11a/n						

5.4 Output power measurement results

Output power measurement for GSM

[GSM]

*Connection Type > AUTO
*Power control level > 5(GSM850),0(PCS1900)

[GPRS]

*Connection Type > Type B
*Power control level > 5(GSM850),0(PCS1900)
*Coding Scheme > CS-1

[EGPRS]

*Connection Type > Type B
*Power control level > 5(GSM850),0(PCS1900)
*Coding Scheme > MCS-1 & MCS-5

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SAR measurement for GSM

1) GSM850 (Normal mode)

1.The GPRS 4up mode was maximum time-based average power. The other slots SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured GPRS 4up mode.

GSM850 SAR Power (Normal)											
Mode	Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Slotted-AVG			
				Reading [dBm] Time-AVG	Atten. [dB]	Cable Loss [dB]	Result [dBm] Time-AVG	Reading [dBm] slotted AVG	Cable Loss [dB]	Result [dBm] Slotted AVG	
GSM	1slot	8.3	128	824.2	-1.14	23.35	0.17	22.38	28.21	3.72	31.93
			190	836.6	-1.08	23.35	0.17	22.44	28.11	3.72	31.83
			251	848.8	-1.12	23.35	0.17	22.40	28.10	3.72	31.82
GPRS (CS1)	1slot	8.3	128	824.2	-1.28	23.35	0.17	22.24	28.21	3.72	31.93
			190	836.6	-1.34	23.35	0.17	22.18	28.11	3.72	31.83
			251	848.8	-1.33	23.35	0.17	22.19	28.09	3.72	31.81
	2slots	4.2	128	824.2	-0.11	23.35	0.17	23.41	26.36	3.72	30.08
			190	836.6	-0.18	23.35	0.17	23.34	26.20	3.72	29.92
			251	848.8	-0.22	23.35	0.17	23.30	26.22	3.72	29.94
	3slots	2.8	128	824.2	-0.23	23.35	0.17	23.29	24.37	3.72	28.09
			190	836.6	-0.31	23.35	0.17	23.21	24.25	3.72	27.97
			251	848.8	-0.37	23.35	0.17	23.15	24.27	3.72	27.99
	4slots	2.1	128	824.2	0.08	23.35	0.17	23.60	23.44	3.72	27.16
			190	836.6	0.00	23.35	0.17	23.52	23.35	3.72	27.07
			251	848.8	-0.06	23.35	0.17	23.46	23.30	3.72	27.02
EGPRS (MCS1)	1slot	8.3	128	824.2	-1.23	23.35	0.17	22.29	28.20	3.72	31.92
			190	836.6	-1.34	23.35	0.17	22.18	28.11	3.72	31.83
			251	848.8	-1.39	23.35	0.17	22.13	28.09	3.72	31.81
	2slots	4.2	128	824.2	-0.10	23.35	0.17	23.42	26.38	3.72	30.10
			190	836.6	-0.16	23.35	0.17	23.36	26.32	3.72	30.04
			251	848.8	-0.27	23.35	0.17	23.25	26.27	3.72	29.99
	3slots	2.8	128	824.2	-0.25	23.35	0.17	23.27	24.49	3.72	28.21
			190	836.6	-0.56	23.35	0.17	22.96	24.38	3.72	28.10
			251	848.8	-0.40	23.35	0.17	23.12	24.34	3.72	28.06
	4slots	2.1	128	824.2	0.06	23.35	0.17	23.58	23.57	3.72	27.29
			190	836.6	-0.03	23.35	0.17	23.49	23.45	3.72	27.17
			251	848.8	-0.07	23.35	0.17	23.45	23.40	3.72	27.12
EGPRS (MCS5)	1slot	8.3	128	824.2	-5.41	23.35	0.17	18.11	22.85	3.72	26.57
			190	836.6	-5.43	23.35	0.17	18.09	22.74	3.72	26.46
			251	848.8	-5.34	23.35	0.17	18.18	22.70	3.72	26.42
	2slots	4.2	128	824.2	-3.37	23.35	0.17	20.15	23.02	3.72	26.74
			190	836.6	-3.38	23.35	0.17	20.14	22.97	3.72	26.69
			251	848.8	-3.41	23.35	0.17	20.11	22.91	3.72	26.63
	3slots	2.8	128	824.2	-1.82	23.35	0.17	21.70	23.06	3.72	26.78
			190	836.6	-1.77	23.35	0.17	21.75	22.95	3.72	26.67
			251	848.8	-1.86	23.35	0.17	21.66	22.94	3.72	26.66
	4slots	2.1	128	824.2	-3.33	23.35	0.17	20.19	20.14	3.72	23.86
			190	836.6	-3.48	23.35	0.17	20.04	20.05	3.72	23.77
			251	848.8	-3.53	23.35	0.17	19.99	20.02	3.72	23.74

Time based AVG Results = P/M Reading + Atten.Loss + Cable Loss

Slotted AVG Results = Agilent Reading + Cable Loss

Maximum time based AVG power mode

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2) GSM850 (Power reduction mode)

1.The GPRS 4up mode was maximum time-based average power. The other slots SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured GPRS 4up mode.

GSM850 SAR Power (Power reduction)											
Mode	Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Slotted-AVG			
				Reading [dBm] Time-AVG	Atten. [dB]	Cable Loss [dB]	Result [dBm] Time-AVG	Reading [dBm] slotted AVG	Cable Loss [dB]	Result [dBm] Slotted AVG	
GSM	1slot	8.3	128	824.2	-6.73	23.35	0.17	16.79	22.54	3.72	26.26
			190	836.6	-6.70	23.35	0.17	16.82	22.52	3.72	26.24
			251	848.8	-6.75	23.35	0.17	16.77	22.48	3.72	26.20
GPRS (CS1)	1slot	8.3	128	824.2	-6.98	23.35	0.17	16.54	22.58	3.72	26.30
			190	836.6	-6.84	23.35	0.17	16.68	22.55	3.72	26.27
			251	848.8	-6.93	23.35	0.17	16.59	22.52	3.72	26.24
	2slots	4.2	128	824.2	-5.88	23.35	0.17	17.64	20.58	3.72	24.30
			190	836.6	-5.86	23.35	0.17	17.66	20.51	3.72	24.23
			251	848.8	-5.91	23.35	0.17	17.61	20.50	3.72	24.22
	3slots	2.8	128	824.2	-6.07	23.35	0.17	17.45	18.63	3.72	22.35
			190	836.6	-6.06	23.35	0.17	17.46	18.62	3.72	22.34
			251	848.8	-6.17	23.35	0.17	17.35	18.56	3.72	22.28
	4slots	2.1	128	824.2	-5.84	23.35	0.17	17.68	17.63	3.72	21.35
			190	836.6	-5.80	23.35	0.17	17.72	17.65	3.72	21.37
			251	848.8	-5.85	23.35	0.17	17.67	17.59	3.72	21.31
EGPRS (MCS1)	1slot	8.3	128	824.2	-6.94	23.35	0.17	16.58	22.53	3.72	26.25
			190	836.6	-6.87	23.35	0.17	16.65	22.54	3.72	26.26
			251	848.8	-6.89	23.35	0.17	16.63	22.50	3.72	26.22
	2slots	4.2	128	824.2	-5.95	23.35	0.17	17.57	20.55	3.72	24.27
			190	836.6	-5.94	23.35	0.17	17.58	20.50	3.72	24.22
			251	848.8	-5.90	23.35	0.17	17.62	20.47	3.72	24.19
	3slots	2.8	128	824.2	-6.05	23.35	0.17	17.47	18.59	3.72	22.31
			190	836.6	-6.07	23.35	0.17	17.45	18.56	3.72	22.28
			251	848.8	-6.06	23.35	0.17	17.46	18.50	3.72	22.22
	4slots	2.1	128	824.2	-5.85	23.35	0.17	17.67	17.59	3.72	21.31
			190	836.6	-5.82	23.35	0.17	17.70	17.57	3.72	21.29
			251	848.8	-5.86	23.35	0.17	17.66	17.52	3.72	21.24
EGPRS (MCS5)	1slot	8.3	128	824.2	-9.38	23.35	0.17	14.14	19.51	3.72	23.23
			190	836.6	-9.45	23.35	0.17	14.07	19.46	3.72	23.18
			251	848.8	-9.44	23.35	0.17	14.08	19.40	3.72	23.12
	2slots	4.2	128	824.2	-9.20	23.35	0.17	14.32	18.19	3.72	21.91
			190	836.6	-8.28	23.35	0.17	15.24	18.15	3.72	21.87
			251	848.8	-8.27	23.35	0.17	15.25	18.11	3.72	21.83
	3slots	2.8	128	824.2	-7.99	23.35	0.17	15.53	16.81	3.72	20.53
			190	836.6	-8.02	23.35	0.17	15.50	16.72	3.72	20.44
			251	848.8	-8.15	23.35	0.17	15.37	16.68	3.72	20.40
	4slots	2.1	128	824.2	-8.24	23.35	0.17	15.28	15.43	3.72	19.15
			190	836.6	-8.25	23.35	0.17	15.27	15.45	3.72	19.17
			251	848.8	-8.26	23.35	0.17	15.26	15.37	3.72	19.09

Time based AVG Results = P/M Reading + Atten.Loss + Cable Loss

Slotted AVG Results = Agilent Reading + Cable Loss

 :Maximum time based AVG power mode

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3) PCS1900 (Normal mode)

1.The GPRS 3up mode was maximum time-based average power. The other slots SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured GPRS 3up mode.

PCS1900 SAR Power (Normal)											
Mode	Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Slotted-AVG			
				Reading [dBm] Time-AVG	Atten. [dB]	Cable Loss [dB]	Result [dBm] Time-AVG	Reading [dBm] slotted AVG	Cable Loss [dB]	Result [dBm] Slotted AVG	
GSM	1slot	8.3	512	1850.2	-3.56	23.36	0.26	20.06	25.45	3.89	29.34
			661	1880.0	-3.61	23.36	0.26	20.01	25.48	3.89	29.37
			810	1909.8	-3.60	23.36	0.26	20.02	25.46	3.89	29.35
GPRS (CS1)	1slot	8.3	512	1850.2	-3.80	23.36	0.26	19.82	25.45	3.89	29.34
			661	1880.0	-3.70	23.36	0.26	19.92	25.49	3.89	29.38
			810	1909.8	-3.81	23.36	0.26	19.81	25.47	3.89	29.36
	2slots	4.2	512	1850.2	-3.11	23.36	0.26	20.51	23.07	3.89	26.96
			661	1880.0	-3.09	23.36	0.26	20.53	23.11	3.89	27.00
			810	1909.8	-3.14	23.36	0.26	20.48	23.10	3.89	26.99
	3slots	2.8	512	1850.2	-2.82	23.36	0.26	20.80	21.62	3.89	25.51
			661	1880.0	-2.04	23.36	0.26	21.58	21.62	3.89	25.51
			810	1909.8	-2.85	23.36	0.26	20.77	21.64	3.89	25.53
	4slots	2.1	512	1850.2	-3.07	23.36	0.26	20.55	20.18	3.89	24.07
			661	1880.0	-3.00	23.36	0.26	20.62	20.18	3.89	24.07
			810	1909.8	-3.10	23.36	0.26	20.52	20.17	3.89	24.06
EGPRS (MCS1)	1slot	8.3	512	1850.2	-3.63	23.36	0.26	19.99	25.43	3.89	29.32
			661	1880.0	-3.61	23.36	0.26	20.01	25.44	3.89	29.33
			810	1909.8	-3.70	23.36	0.26	19.92	25.43	3.89	29.32
	2slots	4.2	512	1850.2	-3.14	23.36	0.26	20.48	23.13	3.89	27.02
			661	1880.0	-3.06	23.36	0.26	20.56	23.16	3.89	27.05
			810	1909.8	-3.19	23.36	0.26	20.43	23.17	3.89	27.06
	3slots	2.8	512	1850.2	-2.87	23.36	0.26	20.75	21.67	3.89	25.56
			661	1880.0	-2.82	23.36	0.26	20.80	21.70	3.89	25.59
			810	1909.8	-2.92	23.36	0.26	20.70	21.70	3.89	25.59
	4slots	2.1	512	1850.2	-3.04	23.36	0.26	20.58	20.20	3.89	24.09
			661	1880.0	-2.98	23.36	0.26	20.64	20.23	3.89	24.12
			810	1909.8	-3.11	23.36	0.26	20.51	20.21	3.89	24.10
EGPRS (MCS5)	1slot	8.3	512	1850.2	-6.99	23.36	0.26	16.63	21.54	3.89	25.43
			661	1880.0	-7.02	23.36	0.26	16.60	21.53	3.89	25.42
			810	1909.8	-6.91	23.36	0.26	16.71	21.54	3.89	25.43
	2slots	4.2	512	1850.2	-4.59	23.36	0.26	19.03	21.64	3.89	25.53
			661	1880.0	-4.68	23.36	0.26	18.94	21.63	3.89	25.52
			810	1909.8	-4.75	23.36	0.26	18.87	21.61	3.89	25.50
	3slots	2.8	512	1850.2	-2.91	23.36	0.26	20.71	21.70	3.89	25.59
			661	1880.0	-2.86	23.36	0.26	20.76	21.71	3.89	25.60
			810	1909.8	-3.09	23.36	0.26	20.53	21.64	3.89	25.53
	4slots	2.1	512	1850.2	-4.62	23.36	0.26	19.00	18.75	3.89	22.64
			661	1880.0	-4.75	23.36	0.26	18.87	18.76	3.89	22.65
			810	1909.8	-4.71	23.36	0.26	18.91	18.71	3.89	22.60

Time based AVG Results = P/M Reading + Atten.Loss + Cable Loss

Slotted AVG Results = Agilent Reading + Cable Loss

Maximum time based AVG power mode

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4) PCS1900 (Power reduction mode)

1. The GPRS 3up mode was maximum time-based average power. The other slots SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured GPRS 3up mode.

PCS1900 SAR Power (Power reduction)												
Mode	Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Slotted-AVG				
				P/M Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Agilent Reading [dBm]	Cable Loss [dB]	Result [dBm]		
				Time-AVG			Time-AVG	slotted AVG		Slotted AVG		
GSM	1slot	8.3	512	1850.2	-10.34	23.36	0.26	13.28	18.71	3.89	22.60	
			661	1880.0	-10.25	23.36	0.26	13.37	18.79	3.89	22.68	
			810	1909.8	-10.48	23.36	0.26	13.14	18.59	3.89	22.48	
	GPRS (CS1)	1slot	8.3	512	1850.2	-10.43	23.36	0.26	13.19	18.73	3.89	22.62
				661	1880.0	-10.40	23.36	0.26	13.22	18.82	3.89	22.71
				810	1909.8	-10.61	23.36	0.26	13.01	18.60	3.89	22.49
		2slots	4.2	512	1850.2	-9.95	23.36	0.26	13.67	16.26	3.89	20.15
				661	1880.0	-9.93	23.36	0.26	13.69	16.37	3.89	20.26
				810	1909.8	-10.21	23.36	0.26	13.41	16.16	3.89	20.05
3slots		2.8	512	1850.2	-9.72	23.36	0.26	13.90	14.95	3.89	18.84	
			661	1880.0	-9.66	23.36	0.26	13.96	15.00	3.89	18.89	
			810	1909.8	-9.91	23.36	0.26	13.71	14.78	3.89	18.67	
4slots		2.1	512	1850.2	-9.93	23.36	0.26	13.69	13.73	3.89	17.62	
			661	1880.0	-9.85	23.36	0.26	13.77	13.78	3.89	17.67	
			810	1909.8	-10.14	23.36	0.26	13.48	13.62	3.89	17.51	
EGPRS (MCS1)	1slot	8.3	512	1850.2	-10.45	23.36	0.26	13.17	18.72	3.89	22.61	
			661	1880.0	-10.38	23.36	0.26	13.24	18.81	3.89	22.70	
			810	1909.8	-10.65	23.36	0.26	12.97	18.60	3.89	22.49	
	2slots	4.2	512	1850.2	-9.87	23.36	0.26	13.75	16.24	3.89	20.13	
			661	1880.0	-9.81	23.36	0.26	13.81	16.37	3.89	20.26	
			810	1909.8	-10.17	23.36	0.26	13.45	16.16	3.89	20.05	
	3slots	2.8	512	1850.2	-9.73	23.36	0.26	13.89	14.74	3.89	18.63	
			661	1880.0	-9.68	23.36	0.26	13.94	14.82	3.89	18.71	
			810	1909.8	-9.95	23.36	0.26	13.67	14.60	3.89	18.49	
	4slots	2.1	512	1850.2	-9.93	23.36	0.26	13.69	13.31	3.89	17.20	
			661	1880.0	-9.86	23.36	0.26	13.76	13.37	3.89	17.26	
			810	1909.8	-10.08	23.36	0.26	13.54	13.17	3.89	17.06	
EGPRS (MCS5)	1slot	8.3	512	1850.2	-12.26	23.36	0.26	11.36	16.59	3.89	20.48	
			661	1880.0	-12.10	23.36	0.26	11.52	16.66	3.89	20.55	
			810	1909.8	-12.39	23.36	0.26	11.23	16.41	3.89	20.30	
	2slots	4.2	512	1850.2	-11.92	23.36	0.26	11.70	14.22	3.89	18.11	
			661	1880.0	-11.85	23.36	0.26	11.77	14.26	3.89	18.15	
			810	1909.8	-12.19	23.36	0.26	11.43	14.09	3.89	17.98	
	3slots	2.8	512	1850.2	-11.73	23.36	0.26	11.89	12.80	3.89	16.69	
			661	1880.0	-11.83	23.36	0.26	11.79	12.79	3.89	16.68	
			810	1909.8	-12.03	23.36	0.26	11.59	12.60	3.89	16.49	
	4slots	2.1	512	1850.2	-11.55	23.36	0.26	12.07	11.71	3.89	15.60	
			661	1880.0	-11.57	23.36	0.26	12.05	11.75	3.89	15.64	
			810	1909.8	-11.65	23.36	0.26	11.97	11.59	3.89	15.48	

Time based AVG Results = P/M Reading + Atten.Loss + Cable Loss

Slotted AVG Results = Agilent Reading + Cable Loss

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Output power measurement for W-CDMA

Maximum output power for W-CDMA and HSPA was verified on the high, middle and low channels according to the procedures described in section 5.2 of 3GPP TS 34.121 and "KDB 941225 document".

The WCDMA and HSPA modes of EUT were verified each channel and "sub-tests" according to Release-6 procedures in section 5.2 of 3GPP TS 34.121.

[Rel.99]

The communication test set was using a 12.2k RMC (reference measurement channel) with TPC (transmit power control) set to all "1's" configured in Test Loop Mode 1.

[HSDPA]

The communication test set was using an FRC (Fixed reference channel) with H-set 1 and 12.2kbps RMC with TPC (transmit power control) set to all "1's". Output power was measured according requirements for HS-DPCCH Sub-test 1-4.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	$\beta_c\beta_d$	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	15/15	64	12/15	24/15	1.0	0.0
	(Note 4)	(Note 4)		(Note 4)			
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 $\Delta_{CQI} = 30/15$ 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, Δ_{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 $\beta_d = 15/15$.

Test Equipment Setting Summary Table

The following table is the key parameters that was configured in test equipment.

Subtest	Mode	Loopback Mode	Rel99 RMC	HSDPA FRC	HSUPA Test	Common Setting		$\beta_c\beta_d$	MPR	Power Class 3 limit
						β_c	β_d			
	Rel99	Test Mode 1	12.2kbps RMC	-	-			8/15		24(+1.7/-3.7dB)
1	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (HPSK)	-	2/15	15/15	2/15	0	24(+1.7/-3.7dB)
2	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (HPSK)	-	12/15	15/15	12/15	0	24(+1.7/-3.7dB)
3	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (HPSK)	-	15/15	8/15	15/8	0.5	23.5(+2.2/-3.7dB)
4	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (HPSK)	-	15/15	4/15	15/4	0.5	23.5(+2.2/-3.7dB)

Subtest	HSDPA Specific Settings						
	Δ_{ACK}	Δ_{NACK}	Δ_{CQI}	Ack-Nack repetition factor	CQI Feedback	CQI Repetition Factor	Ahs= β_{hs}/β_c
Rel 6 HSDPA							
1	8	8	8	3	4ms	2	30/15
2	8	8	8	3	4ms	2	30/15
3	8	8	8	3	4ms	2	30/15
4	8	8	8	3	4ms	2	30/15

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SAR measurement for W-CDMA

5) WCDMA V (Normal mode/ Power reduction mode)

1. The 12.2k RMC mode was maximum average power. The AMR/HSDPA/HSUPA SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured 12.2k RMC mode.

WCDMA V band								
Mode	Ch	Normal				Power reduction		
		Frequency [MHz]	Reading AVG [dBm]	Cable loss [dB]	Result [dBm]	Reading AVG [dBm]	Cable loss [dB]	Result [dBm]
AMR	4132	826.4	22.31	0.17	22.48	17.63	0.17	17.80
	4183	836.6	22.29	0.17	22.46	17.50	0.17	17.67
	4233	846.6	22.19	0.17	22.36	17.47	0.17	17.64
RMC 12.2kbps	4132	826.4	22.33	0.17	22.50	17.63	0.17	17.80
	4183	836.6	22.30	0.17	22.47	17.50	0.17	17.67
	4233	846.6	22.19	0.17	22.36	17.47	0.17	17.64
HSDPA Subtest1	4132	826.4	22.33	0.17	22.50	17.39	0.17	17.56
	4183	836.6	22.28	0.17	22.45	17.37	0.17	17.54
	4233	846.6	22.15	0.17	22.32	17.31	0.17	17.48
HSDPA Subtest2	4132	826.4	22.06	0.17	22.23	17.13	0.17	17.30
	4183	836.6	22.04	0.17	22.21	17.09	0.17	17.26
	4233	846.6	21.90	0.17	22.07	17.05	0.17	17.22
HSDPA Subtest3	4132	826.4	21.81	0.17	21.98	16.89	0.17	17.06
	4183	836.6	21.76	0.17	21.93	16.84	0.17	17.01
	4233	846.6	21.66	0.17	21.83	16.81	0.17	16.98
HSDPA Subtest4	4132	826.4	21.55	0.17	21.72	16.65	0.17	16.82
	4183	836.6	21.51	0.17	21.68	16.59	0.17	16.76
	4233	846.6	21.40	0.17	21.57	16.56	0.17	16.73
HSUPA Subtest1	4132	826.4	21.22	0.17	21.39	16.69	0.17	16.86
	4183	836.6	21.31	0.17	21.48	16.57	0.17	16.74
	4233	846.6	21.16	0.17	21.33	16.54	0.17	16.71
HSUPA Subtest2	4132	826.4	19.95	0.17	20.12	15.25	0.17	15.42
	4183	836.6	20.00	0.17	20.17	15.21	0.17	15.38
	4233	846.6	19.89	0.17	20.06	15.38	0.17	15.55
HSUPA Subtest3	4132	826.4	21.05	0.17	21.22	16.21	0.17	16.38
	4183	836.6	21.05	0.17	21.22	16.19	0.17	16.36
	4233	846.6	20.91	0.17	21.08	16.14	0.17	16.31
HSUPA Subtest4	4132	826.4	20.54	0.17	20.71	15.53	0.17	15.70
	4183	836.6	20.53	0.17	20.70	15.45	0.17	15.62
	4233	846.6	20.39	0.17	20.56	15.62	0.17	15.79
HSUPA Subtest5	4132	826.4	21.44	0.17	21.61	16.50	0.17	16.67
	4183	836.6	21.42	0.17	21.59	16.42	0.17	16.59
	4233	846.6	21.21	0.17	21.38	16.44	0.17	16.61

Results = Reading + Loss

Maximum power mode

Note: HSUPA

The enhanced power reduction may result in around 1dB of variance from the MPR target values depending on HSPA channel configuration (e.g. 34.121 subtest) and characteristics of hardware RF design.

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6) WCDMA II (Normal mode/ Power reduction mode)

Note:

1. The 12.2k RMC mode was maximum average power. The AMR/HSDPA/HSUPA SAR is not required for other mode because the maximum average output power for other mode is less than 1/4dB higher than that measured 12.2k RMC mode.

WCDMA II band								
Normal						Power reduction		
Mode	Ch	Frequency [MHz]	Reading AVG [dBm]	Cable [dB]	Result [dBm]	Reading AVG [dBm]	Cable [dB]	Result [dBm]
AMR	9262	1852.4	21.40	0.26	21.66	13.70	0.26	13.96
	9400	1880.0	21.34	0.26	21.60	13.75	0.26	14.01
	9538	1907.6	21.38	0.26	21.64	13.80	0.26	14.06
RMC 12.2kbps	9262	1852.4	21.52	0.26	21.78	13.70	0.26	13.96
	9400	1880.0	21.34	0.26	21.60	13.75	0.26	14.01
	9538	1907.6	21.40	0.26	21.66	13.80	0.26	14.06
HSDPA Subtest1	9262	1852.4	21.48	0.26	21.74	13.58	0.26	13.84
	9400	1880.0	21.33	0.26	21.59	13.62	0.26	13.88
	9538	1907.6	21.42	0.26	21.68	13.63	0.26	13.89
HSDPA Subtest2	9262	1852.4	21.20	0.26	21.46	13.34	0.26	13.60
	9400	1880.0	21.04	0.26	21.30	13.28	0.26	13.54
	9538	1907.6	21.15	0.26	21.41	13.38	0.26	13.64
HSDPA Subtest3	9262	1852.4	20.94	0.26	21.20	13.05	0.26	13.31
	9400	1880.0	20.77	0.26	21.03	13.01	0.26	13.27
	9538	1907.6	20.90	0.26	21.16	13.10	0.26	13.36
HSDPA Subtest4	9262	1852.4	20.68	0.26	20.94	12.66	0.26	12.92
	9400	1880.0	20.53	0.26	20.79	12.68	0.26	12.94
	9538	1907.6	20.64	0.26	20.90	12.65	0.26	12.91
HSUPA Subtest1	9262	1852.4	20.34	0.26	20.60	12.62	0.26	12.88
	9400	1880.0	20.33	0.26	20.59	12.60	0.26	12.86
	9538	1907.6	20.31	0.26	20.57	12.60	0.26	12.86
HSUPA Subtest2	9262	1852.4	19.50	0.26	19.76	11.63	0.26	11.89
	9400	1880.0	19.01	0.26	19.27	11.70	0.26	11.96
	9538	1907.6	19.11	0.26	19.37	11.74	0.26	12.00
HSUPA Subtest3	9262	1852.4	20.24	0.26	20.50	12.15	0.26	12.41
	9400	1880.0	20.06	0.26	20.32	12.18	0.26	12.44
	9538	1907.6	20.04	0.26	20.30	12.30	0.26	12.56
HSUPA Subtest4	9262	1852.4	19.75	0.26	20.01	11.41	0.26	11.67
	9400	1880.0	19.54	0.26	19.80	11.38	0.26	11.64
	9538	1907.6	19.60	0.26	19.86	11.44	0.26	11.70
HSUPA Subtest5	9262	1852.4	20.41	0.26	20.67	12.62	0.26	12.88
	9400	1880.0	20.42	0.26	20.68	12.54	0.26	12.80
	9538	1907.6	20.46	0.26	20.72	12.63	0.26	12.89

Results = Reading + Loss

: Maximum power mode

Note: HSUPA

The enhanced power reduction may result in around 1dB of variance from the MPR target values depending on HSPA channel configuration (e.g. 34.121 subtest) and characteristics of hardware RF design.

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7) Power reduction results for each mode

Mode	Average power reduction results	Tolerance
	[dB]	[dB]
GSM850 GSM/GPRS	5.68	6 +/-2
GSM850 EGPRS	4.76	
PCS1900 GSM/GPRS	6.71	6.5+/-2
PCS1900 EGPRS	7.11	
WCDMA band V AMR/12.2k RMC	4.73	5 +/-2
WCDMA band V HSDPA/HSUPA	4.83	
WCDMA band II AMR/12.2k RMC	7.65	8+/-2
WCDMA band II /HSDPA/HSUPA	7.84	
WLAN 11b/g/n	Power reduction is not implemented for WLAN	
WLAN 11a/n		

5.5 Confirmation before SAR testing**Correlation of Output Power between EMC and SAR tests**

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)

5.6 Confirmation after SAR testing

It was checked that the power drift [W] is within +/-5%.The verification of power drift during the SAR test is that DASY5 system calculates the power drift by measureing the e-filed at the same location at beginning and the end of the scan measurement for each test position.

DASY5 system calucation Power drift value[dB] =20log(Ea)/(Eb)

Before SAR testing : Eb[V/m]

After SAR testing : Ea[V/m]

Limit of power drift[W] =+/-5%

X[dB]=10log[P]=10log(1.05/1)=10log(1.05)-10log(1)=0.212dB

from E-filed relations with power.

$p=E^2/\eta=E^2/$

Therefore, The correlation of power and the E-filed

$XdB=10log(P)=10log(E)^2=20log(E)$

Therefore,

The calculated power drift of DASY5 System must be the less than +/-0.212dB.

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SECTION6 : Description of the Head/Body setup

6.1 Specification of sensor

This EUT has a proximity sensor and two grip sensors for power reduction. These sensors detect the human skin within 70mm from front display, 10mm from the rear case and 5mm from top edge of EUT.

Sensor specification			
Position	Yes/No	Type	Distance detected
Front	Yes	Proximity	70mm
Rear	Yes	Grip	10mm
Right edge	No	-	-
Left edge	No	-	-
Top edge	Yes	Grip	5mm
Bottom edge	No	-	-

6.2 Test position for Head setup

i) Procedure for SAR testing

The EUT was tested in accordance with FCC OET Bulletin 65 Supplement C: 2001-01 and IEEE 1528: 2003 for both the “Cheek/Touch” and “Ear/Tilt” positions at the left and right sides of the SAM phantom head region. The FCC KDB 648474 D01 was also incorporated.

ii) Test mode

GSM850/PCS1900	Voice mode (GSM)/VOIP mode(Worst mode in Data transmission)
WCDMA V/II	12.2k RMC
WLAN	VOIP mode

iii) Test position

The measurement is performed in EUT with power reduction for proximity sensor located at front position.

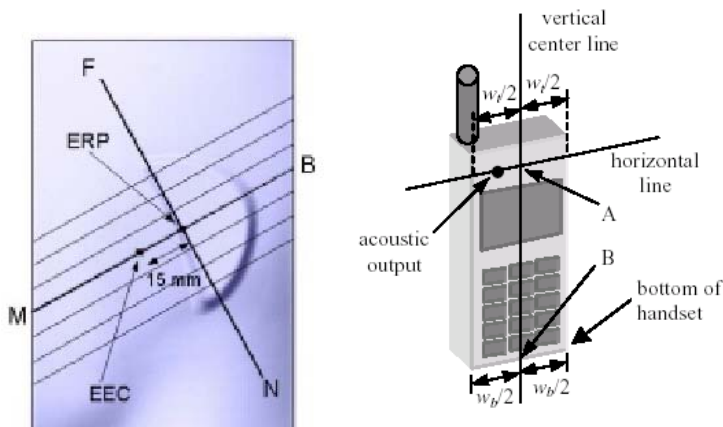
The measurement with a separation of 7cm was excluded because the use for head at a distance of 7cm is not intended and also the distance between user and antenna is more than 5cm.

- (1) Left cheek
- (2) Left tilt
- (3) Right cheek
- (4) Right tilt

Initial ear position

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom.

The device should be positioned parallel to the “N-F” line defined along the base of the ear spacer that contains the “ear reference point”. The “test device reference point” is aligned to the “ear reference point” on the head phantom and the “vertical centerline” is aligned to the “phantom reference plane”.

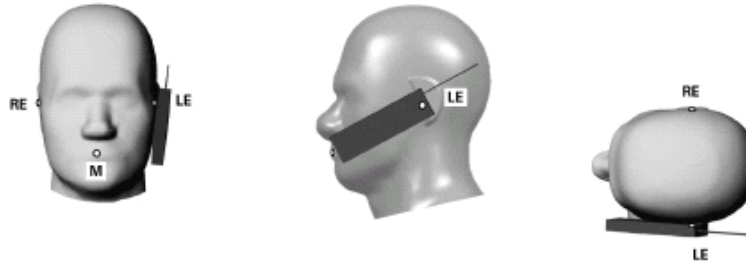


Cheek position

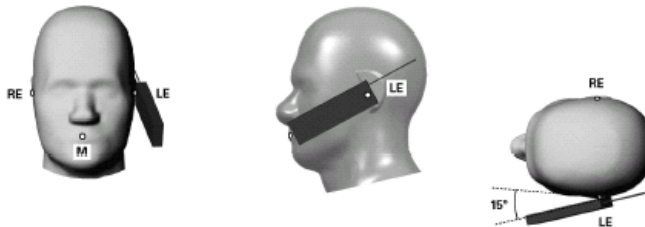
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line.

This test position is established:

- i) When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.
- ii) (or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

**Tilt position**

If the earpiece of the handset is not in full contact with the phantom’s ear spacer and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer. Otherwise the handset should be moved away from the cheek perpendicular to the line passes through both “ear reference points” for approximate 2-3 cm. While it is in this position, the handset is tilted away from the mouth with respect to the “test device reference point” by 15°. After the tilt, it is then moved back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously.

**SAR test in Mouse and Jaw Regions of the SAM Phantom**

The measurement procedure using a flat phantom according to the KDB648474 D01.

The SAR required in these regions of SAM should be measured using a flat phantom. Rectangular shaped phones should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned ½ cm from the flat phantom shell.

<Antenna position>

The antennas use for WWAN and WLAN are both separate in a single fixed position. The antennas are integral part of the device.

6.3 Description of the Body setup

i) Procedure for SAR testing

-The tested distance were performed according to the KDB447498D01 (Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies)

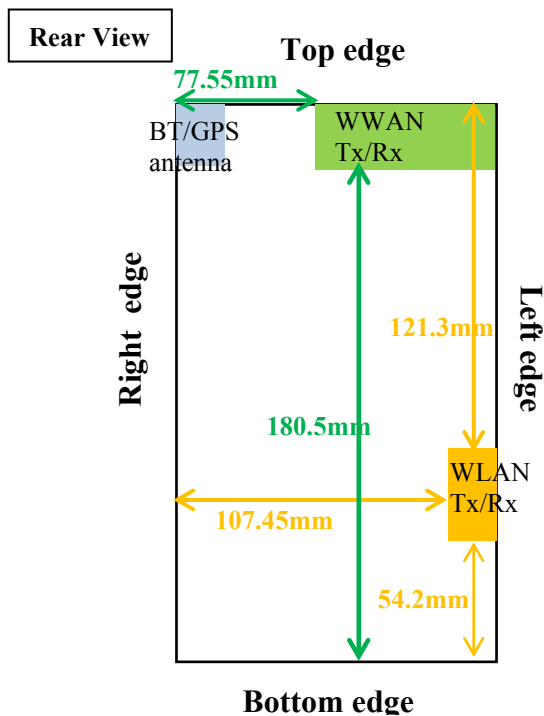
<Reference procedure>

-The tested distance were performed according to the KDB941225 D06 v01 (SAR Evaluation Procedures for portable Devices with Wireless Router Capabilities) (Device dimensions : 193.6 mm x 122.35mm (Diagonal dimension:220mm))

ii) Test mode

GSM850/PCS1900	Data transmission mode (GPRS)
WCDMA V/II	Data transmission mode (12.2kRMC)
WLAN	Data transmission mode

iii) Test Position

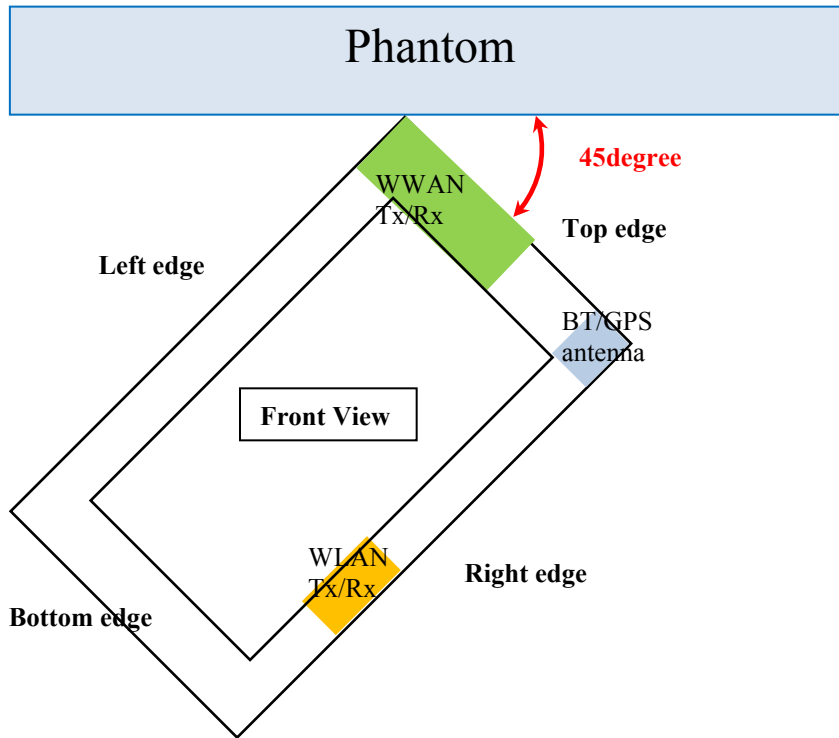


Position	WWAN	WLAN
Front (Hotspot)	Not required (Tested for reference purposes only)	Not required (Tested for reference purposes only (2.4GHz only))
Rear	Tested	Tested
Right edge	Not required	Not required
Left edge	Tested	Tested
Top edge	Tested	Not required
Bottom edge	Not required	Not required
Top 45degree	Tested	Not required

NOTE1: Test position is required to the edge within 5cm from antenna according to the KDB 447498D1.

NOTE2: Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

Top 45degree Position



iv) Test configurations

EUT checked to the condition with or without headset. As the result, all tests were performed in the EUT without headset as worst condition.

<WWAN>

(1) Rear (10mm) :

The measurement separated 10mm distance between the rear surface of EUT with normal power to the flat Phantom.

(2) Rear (0mm) :

The measurement touched to the rear surface of EUT with power reduction to the flat Phantom.

(3) Top (5mm) :

The measurement separated 5mm distance between the top edge of EUT with normal power to the flat Phantom.

(4) Top (0mm) :

The measurement touched to the top edge of EUT with power reduction to the flat Phantom.

(5) Left edge (0mm) :

The measurement touched to the left edge of EUT with normal power to the flat Phantom.

(6) Front (10mm) :

The measurement separated 10mm distance between the front surface of EUT with power reduction to the flat Phantom.

This condition is reference data for a hotspot mode procedure.

(7) Top 45 degree :

The measurement leaned a top edge of EUT to 45 degrees from the vertex touched to flat phantom. The condition of power was a normal power. The vertex position was the corner where the WWAN antenna is the closest.

<WLAN>

(1) Rear (10mm) :

The measurement separated 10mm distance between the rear surface of EUT to the flat Phantom.

This condition is for evaluation of simultaneous transmission.

(2) Rear (0mm) :

The measurement touched to the rear surface of EUT to the flat Phantom.

(3) Left edge (0mm) :

The measurement touched to the left edge of EUT to the flat Phantom.

(4) Front (10mm) :

The measurement separated 10mm distance between the front surface of EUT with power reduction to the flat Phantom.

This condition is reference data for a hotspot mode procedure.

<Antenna position>

The antennas use for WWAN and WLAN are both separate in a single fixed position. The antennas are integral part of the device.

SECTION 7 : Test surrounding

7.1 Measurement uncertainty

The uncertainty budget has been determined for the DASY5 measurement system according to the SPEAG documents[2] and is given in the following Table.

<WWAN 300M-3GHz >

Error Description	Uncertainty value \pm %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	± 5.5	Normal	1	1	± 5.5	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	0.7	± 3.9	∞
Boundary effects	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.4	Rectangular	$\sqrt{3}$	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Max.SAR Eval.	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	49
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	10
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 4.6	Rectangular	1	0.64	± 2.9	∞
Liquid permittivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.6	± 1.7	∞
Liquid permittivity (meas.)	-5.0	Rectangular	1	0.6	± 3.0	∞
Combined Standard Uncertainty						
					± 11.316	
Expanded Uncertainty (k=2)						
					± 22.6	

SECTION 8 : Measurement results**8.1 GSM 850MHz HEAD SAR****(1)Method of measurement**

Step1. The searching for the worst position

The test was performed in middle channel.

Step2. The changing to the DATA transmitter for VOIP mode (GPRS)

The test was performed at the worst position of Step1.

Note:

1)For VOIP mode, the GPRS 4up mode was maximum based time average power. The power of other mode was lower than GPRS 4up mode.

2)The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
5-Oct	24	63	HSL900	24.2	835	ϵ_r	41.5	40.3	-2.9	+/-5
						σ [mho/m]	0.90	0.86	-4.4	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of HEAD SAR

HEAD SAR MEASUREMENT RESULTS							
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching							
190	836.6	GSM	Left	Fixed	Cheek	0	0.204
190	836.6	GSM	Left	Fixed	Tilt	0	0.188
190	836.6	GSM	Right	Fixed	Cheek	0	0.388
190	836.6	GSM	Right	Fixed	Tilt	0	0.339
Step.2 VOIP mode (GPRS)							
190	836.6	GPRS 4slots	Right	Fixed	Cheek	0	0.491

Note:

Head measurement condition has a power reduction function with distance detected.

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8.2 PCS 1900MHz HEAD SAR

(1)Method of measurement

- Step1. The searching for the worst position
The test was performed in middle channel.
- Step2. The changing to the Multi slot of DATA transmitter for VOIP mode (GPRS)
The test was performed at the worst position of Step1.

Note:

- 1)For VOIP mode, the GPRS 3up mode was maximum based time average power. The power of other mode was lower than GPRS 3up mode.
- 2)The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.
The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
5-Oct	23	63	HSL 1800	22.5	1880	ϵ_r	40.0	38.0	-5.0	+/-5
						σ [mho/m]	1.40	1.45	3.6	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of HEAD SAR

HEAD SAR MEASUREMENT RESULTS							
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching							
661	1880.0	GSM	Left	Fixed	Cheek	0	0.170
661	1880.0	GSM	Left	Fixed	Tilt	0	0.153
661	1880.0	GSM	Right	Fixed	Cheek	0	0.470
661	1880.0	GSM	Right	Fixed	Tilt	0	0.439
Step.2 VOIP mode (GPRS)							
661	1880.0	GPRS 3slots	Right	Fixed	Cheek	0	0.519

Note:

Head measurement condition has a power reduction function with distance detected.

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8.3 WCDMA Band V HEAD SAR

(1)Method of measurement

Step1. The searching for the worst position
The test was performed in middle channel.

Note:

- 1)The SAR is not required for AMR mode because the maximum average output power for AMR mode is less than 1/4dB higher than that measured 12.2k RMC mode.
- 2)The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.
The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
5-Oct	24	63	HSL900	24.2	835	ϵ_r	41.5	40.3	-2.9	+/-5
						σ [mho/m]	0.90	0.86	-4.4	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of HEAD SAR

HEAD SAR MEASUREMENT RESULTS							
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching							
4183	836.6	12.2k RMC	Left	Fixed	Cheek	0	0.240
4183	836.6	12.2k RMC	Left	Fixed	Tilt	0	0.198
4183	836.6	12.2k RMC	Right	Fixed	Cheek	0	0.421
4183	836.6	12.2k RMC	Right	Fixed	Tilt	0	0.432

Note:

Head measurement condition has a power reduction function with distance detected.

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8.4 WCDMA Band II HEAD SAR

(1) Method of measurement

Step1. The searching for the worst position

The test was performed in middle channel.

Note:

- 1)The SAR is not required for AMR mode because the maximum average output power for AMR mode is less than 1/4dB higher than that measured 12.2k RMC mode.
- 2)The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2) Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
5-Oct	23	63	HSL 1800	22.5	1880	ϵ_r	40.0	38.0	-5.0	+/-5
						σ [mho/m]	1.40	1.45	3.6	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3) Result of HEAD SAR

HEAD SAR MEASUREMENT RESULTS							
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak
Step.1 Position searching							
9400	1880.0	12.2k RMC	Left	Fixed	Cheek	0	0.174
9400	1880.0	12.2k RMC	Left	Fixed	Tilt	0	0.164
9400	1880.0	12.2k RMC	Right	Fixed	Cheek	0	0.614
9400	1880.0	12.2k RMC	Right	Fixed	Tilt	0	0.548

Note:

Head measurement condition has a power reduction function with distance detected.

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8.5 Simultaneous transmission evaluation for HEAD**Result of SUM Σ SAR1g**

SUM Σ SAR1g (GSM850 +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone worst SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		GSM850 Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Right cheek	0	0.491	0.057	0.073	0.548	0.564

SUM Σ SAR1g (PCS1900 +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone worst SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		PCS1900 Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Right cheek	0	0.519	0.057	0.073	0.576	0.592

SUM Σ SAR1g (WCDMA Band V +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone worst SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		WCDMA Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Right tilt	0	0.432	0.057	0.073	0.489	0.505

SUM Σ SAR1g (WCDMA band II+WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone worst SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		WCDMA Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Right cheek	0	0.614	0.057	0.073	0.671	0.687

: Highest SUM Σ SAR1g Head simultaneous transmissions

8.6 GSM 850MHz Body SAR**(1)Method of measurement**

Step1. The searching for the worst position

The test was performed in mode of the middle channel

Step2. Vertex position

The measurement leaned EUT to 45 degrees from the vertex of WWAN antenna touched to flat phantom.

Note:

- 1) The GPRS 4up mode was maximum based time average power. The power of other mode was lower than GPRS 4up mode.
- 2) The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
4-Oct	24	41	MSL 900	24.5	835	ϵ_r	55.2	54.3	-1.6	+/-5
						σ [mho/m]	0.97	0.98	1.0	+/-5
7-Nov	24	45	MSL 900	23.5	835	ϵ_r	55.2	53.3	-3.4	+/-5
						σ [mho/m]	0.97	0.95	-2.1	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]	Note
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	
Step.1 Position searching								
190	836.6	GPRS 4slots	Flat	Fixed	Rear	10	0.432	*1
190	836.6	GPRS 4slots	Flat	Fixed	Rear	0	0.746	*2
190	836.6	GPRS 4slots	Flat	Fixed	Top	5	0.634	*1
190	836.6	GPRS 4slots	Flat	Fixed	Top	0	0.335	*2
190	836.6	GPRS 4slots	Flat	Fixed	Left edge	0	0.358	*1
Reference DATA								
190	836.6	GPRS 4slots	Flat	Fixed	Front	10	0.093	*2,*3
Step.2 Vertex position								
190	836.6	GPRS 4slots	Flat	Fixed	Top	45 degree	0.212	*1

Note

*1 This measurement condition is normal power (maximum power)without a power reduction function.

*2 This measurement condition has a power reduction function with distance detected.

*3 This measurement condition is reference data for hotspot mode.

Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

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8.7 PCS1900MHz Body SAR

(1)Method of measurement

- Step1. The searching for the worst position
The test was performed in mode of the maximum output power.
- Step2. The changing to the channels (Low, High)
The test was performed at the worst condition of Step1.
- Step3. Vertex position
The measurement leaned EUT to 45 degrees from the vertex of WWAN antenna touched to flat phantom.

Note:

- 1) The GPRS 3up mode was maximum based time average power. The power of other mode was lower than GPRS 3up mode.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
3-Oct	22	45	MSL 1800	22.5	1850	ϵ_r	53.3	52.0	-2.5	+/-5
						σ [mho/m]	1.52	1.54	1.3	+/-5
3-Oct	22	45	MSL 1800	22.5	1880	ϵ_r	53.3	51.8	-2.8	+/-5
						σ [mho/m]	1.52	1.57	3.3	+/-5
3-Oct	22	45	MSL 1800	22.5	1900	ϵ_r	53.3	51.8	-2.8	+/-5
						σ [mho/m]	1.52	1.59	4.6	+/-5
7-Nov	24	45	MSL 1800	23.5	1880	ϵ_r	53.3	51.2	-3.9	+/-5
						σ [mho/m]	1.52	1.57	3.3	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]	Note
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	
Step.1 Position searching								
661	1880	GPRS 3slots	Flat	Fixed	Rear	10	0.436	*1
661	1880	GPRS 3slots	Flat	Fixed	Rear	0	0.625	*2
661	1880	GPRS 3slots	Flat	Fixed	Top	5	0.986	*1
661	1880	GPRS 3slots	Flat	Fixed	Top	0	0.402	*2
661	1880	GPRS 3slots	Flat	Fixed	Left edge	0	0.283	*1
Reference DATA								
661	1880	GPRS 3slots	Flat	Fixed	Front	10	0.120	*2,*3
Step.2 Channel change (SAR level in Step.1 > 0.8 w/kg)								
512	1850.2	GPRS 3slots	Flat	Fixed	Top	5	0.968	*1
810	1909.8	GPRS 3slots	Flat	Fixed	Top	5	0.961	*1
Step.3 Vertex position								
661	1880	GPRS 3slots	Flat	Fixed	Top	45 degree	0.546	*1

Note

*1 This measurement condition is normal power (maximum power) without a power reduction function.

*2 This measurement condition has a power reduction function with distance detected.

*3 This measurement condition is reference data for hotspot mode

Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

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8.8 WCDMA Band V Body SAR

(1) Method of measurement

Step1. The searching for the worst position

The test was performed in mode of the maximum output power.

Step2. Vertex position

The measurement leaned EUT to 45 degrees from the vertex of WWAN antenna touched to flat phantom.

Note:

1)The BODY SAR is not required for HSDPA mode because the maximum average output power for HSDPA mode is less than 1/4dB higher than that measured 12.2k RMC mode.

2)The other channel was not required since middle channel SAR value is less than 0.8W/kg.

(2) Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
4-Oct	24	41	MSL 900	24.5	835	ϵ_r	55.2	54.3	-1.6	+/-5
						σ [mho/m]	0.97	0.98	1.0	+/-5
7-Nov	24	45	MSL 900	23.5	835	ϵ_r	55.2	53.3	-3.4	+/-5
						σ [mho/m]	0.97	0.95	-2.1	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3) Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]	Note
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	
Step.1 Position searching								
190	836.6	12.2k RMC	Flat	Fixed	Rear	10	0.323	*1
190	836.6	12.2k RMC	Flat	Fixed	Rear	0	0.767	*2
190	836.6	12.2k RMC	Flat	Fixed	Top	5	0.489	*1
190	836.6	12.2k RMC	Flat	Fixed	Top	0	0.278	*2
190	836.6	12.2k RMC	Flat	Fixed	Left edge	0	0.280	*1
Reference DATA								
190	836.6	12.2k RMC	Flat	Fixed	Front	10	0.100	*2, *3
Step.2 Vertex position								
190	836.6	12.2k RMC	Flat	Fixed	Top	45 degree	0.164	*1

Note

*1 This measurement condition is normal power (maximum power) without a power reduction function.

*2 This measurement condition has a power reduction function with distance detected.

*3 This measurement condition is reference data for hotspot mode

Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

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8.9 WCDMA Band II BodySAR

(1)Method of measurement

- Step1. The searching for the worst position
The test was performed in mode of the maximum output power.
- Step2. The changing to the channels (Low, High)
The test was performed at the worst condition of from Step1.
- Step3. Vertex position
The measurement leaned EUT to 45 degrees from the vertex of WWAN antenna touched to flat phantom.

Note:

1)The BODY SAR is not required for HSDPA mode because the maximum average output power for HSDPA mode is less than 1/4dB higher than that measured 12.2k RMC mode.

(2)Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.

The dielectric parameters measurement is reported in each correspondent section.

DIELECTRIC PARAMETERS MEASUREMENT RESULTS										
Date	Ambient Temp. [deg.c]	Relative Humidity [%]	Liquid type	Liquid Temp. [deg.c]	Measured Frequency [MHz]	Parameters	Target Value*1	Measured	Deviation [%]	Limit [%]
3-Oct	22	45	MSL 1800	22.5	1850	ϵ_r	53.3	52.0	-2.5	+/-5
						σ [mho/m]	1.52	1.54	1.3	+/-5
3-Oct	22	45	MSL 1800	22.5	1880	ϵ_r	53.3	51.8	-2.8	+/-5
						σ [mho/m]	1.52	1.57	3.3	+/-5
3-Oct	22	45	MSL 1800	22.5	1900	ϵ_r	53.3	51.8	-2.8	+/-5
						σ [mho/m]	1.52	1.59	4.6	+/-5
7-Nov	24	45	MSL 1800	23.5	1880	ϵ_r	53.3	51.2	-3.9	+/-5
						σ [mho/m]	1.52	1.57	3.3	+/-5

ϵ_r : Relative Permittivity / σ : Conductivity

*1 The Target value is a parameter defined in FCC OET65.

(3)Result of Body SAR

BODY SAR MEASUREMENT RESULTS								
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			SAR(1g) [W/kg]	Note
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	
Step.1 Position searching								
9400	1880	12.2k RMC	Flat	Fixed	Rear	10	0.535	*1
9400	1880	12.2k RMC	Flat	Fixed	Rear	0	0.646	*2
9400	1880	12.2k RMC	Flat	Fixed	Top	5	0.955	*1
9400	1880	12.2k RMC	Flat	Fixed	Top	0	0.509	*2
9400	1880	12.2k RMC	Flat	Fixed	Left edge	0	0.366	*1
Reference DATA								
9400	1880	12.2k RMC	Flat	Fixed	Front	10	0.123	*2,*3
Step.2 Channel change (SAR level in Step.1 > 0.8 w/kg)								
9262	1852.4	12.2k RMC	Flat	Fixed	Top	5	1.09	*1
9538	1907.6	12.2k RMC	Flat	Fixed	Top	5	1.01	*1
Step.3 Vertex position								
9400	1880	12.2k RMC	Flat	Fixed	Top	45 degree	0.633	*1

Note

*1 This measurement condition is normal power (maximum power) without a power reduction function.

*2 This measurement condition has a power reduction function with distance detected.

*3 This measurement condition is reference data for hotspot mode

Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

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8.10 Simultaneous transmission evaluation for Body

Hotspot mode (body SAR with a 10mm separation from the front of the device to the phantom) is not required because the diagonal dimension of EUT exceeds 20cm. and has not been considered for FCC equipment certification It is provided for reference purposes only.

Result of SUM Σ SAR1g

SUM Σ SAR1g (GSM850 +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		GSM850 Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Rear	10	0.432	0.097	0.083	0.529	0.515
Rear	0	0.746	0.890	0.678	1.636	1.424
Top	5	0.634	- *1	- *1	-	-
Top	0	0.335	- *1	- *1	-	-
Left edge	0	0.358	0.245	0.537	0.603	0.895
Front (Reference)	10	0.093	0.038	- *2	0.131	0.224
Top	45 degree	0.212	- *1	- *1	-	-

: SUM Σ SAR1g >1.6W/kg

SUM Σ SAR1g (PCS1900 +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		PCS1900 Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Rear	10	0.436	0.097	0.083	0.533	0.519
Rear	0	0.625	0.890	0.678	1.515	1.303
Top	5	0.986	- *1	- *1	-	-
Top	0	0.402	- *1	- *1	-	-
Left edge	0	0.283	0.245	0.537	0.528	0.820
Front (Reference)	10	0.120	0.038	- *2	0.158	0.278
Top	45 degree	0.546	- *1	- *1	-	-

*1 This position is not required in WLAN SAR mode since distance from antenna is over 5cm.

*2 This position is not required since WLAN 5GHz has not hotspot mode.

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SUM Σ SAR1g (WCDMA band V +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		WCDMA Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Rear	10	0.323	0.097	0.083	0.420	0.406
Rear	0	0.767	0.890	0.678	1.657	1.445
Top	5	0.489	- *1	- *1	-	-
Top	0	0.278	- *1	- *1	-	-
Left edge	0	0.280	0.245	0.537	0.525	0.817
Front (Reference)	10	0.100	0.038	- *2	0.138	0.238
Top	45 degree	0.164	- *1	- *1	-	-

: SUM Σ SAR1g >1.6W/kg

SUM Σ SAR1g (WCDMA band II +WLAN(2.4G/5G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		WCDMA Band	WLAN 2.4G	WLAN 5G	WWAN + WLAN(2.4G)	WWAN + WLAN(5G)
Rear	10	0.535	0.097	0.083	0.632	0.618
Rear	0	0.646	0.890	0.678	1.536	1.324
Top	5	1.09	- *1	- *1	-	-
Top	0	0.509	- *1	- *1	-	-
Left edge	0	0.366	0.245	0.537	0.611	0.903
Front (Reference)	10	0.123	0.038	- *2	0.161	0.284
Top	45 degree	0.633	- *1	- *1	-	-

: Highest SUM Σ SAR1g Body simultaneous transmissions(in SUM Σ SAR1g <1.6W/kg)

*1 This position is not required in WLAN SAR mode since distance from antenna is over 5cm.

*2 This position is not required since WLAN 5GHz has not hotspot mode.

SAR to Peak Location Separation Ratio

SUM \sum 1-g SAR > 1.6 W/kg

\sum SAR1g >1.6W/kg Condition	\sum 1-g SAR (W/kg)	3D distance (cm)	SAR to peak location separation ratio
Body GSM850 + Body WLAN2.4GHz	1.636	13.05	0.125
Body WCDMA V + Body WLAN2.4GHz	1.657	13.06	0.127

Body GSM850 + Body WLAN2.4GHz

Mode	Value of SAR mW/g	X m	Y m	Z m	
1	GSM850	1.07	0.036	0.087	-0.18
2	WLAN 2.4G	1.5	0.0475	-0.043	-0.179

(d) cm	0.1305	13.05
$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$		

(d)cm : The actual measured distance between peak SAR locations

Body W-CDMA band V+ Body WLAN2.4GHz

Mode	Value of SAR mW/g	X m	Y m	Z m	
1	WCDMA band V	1.11	0.0345	0.087	-0.179
2	WLAN 2.4G	1.5	0.0475	-0.043	-0.179

(d) cm	0.1306	13.06
$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$		

(d)cm : The actual measured distance between peak SAR locations

SECTION 9 Test instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	Power Measurement	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	Power Measurement	2011/09/13 * 12
MAT-24	Attenuator(10dB)(above1 GHz)	Agilent	8493C	71389	Power Measurement	2011/06/23 * 12
MAT-25	Attenuator(10dB)(above1 GHz)	Agilent	8493C	71642	Power Measurement	2011/06/23 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	Power Measurement	2011/09/27 * 12
MCC-91	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30812/2	Power Measurement	2011/05/27 * 12
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2011/02/01 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	SAR	2011/01/28 * 12
MPSE-03	Power sensor	Agilent	E9327A	US40440576	SAR	2011/02/02 * 12
MAT-15	Attenuator(30dB)	Agilent	8498A	US40010300	SAR	2011/02/16 * 12
MSG-10	Signal Generator	Agilent	N5181A	MY47421098	SAR	2011/09/22 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	SAR	2011/03/10 * 12
MRFA-08	Pre Amplifier	TSJ	TCBP0206	-	SAR	2011/03/27 * 12
MHDC-11	Dual Directional Coupler	Hewlett Packard	778D	16605	SAR	Pre Check
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	SAR	Pre Check
MNA-01	Network Analyzer	Agilent/HP	E8358A	US41080381	SAR	2011/08/22 * 12
MDPK-01	Dielectric probe kit	Agilent	85070D	702	SAR	2010/10/25 * 36
MNCK-01	Type N Calibration Kit	Agilent	85032F	MY41495257	SAR	2011/08/12 * 12
MPB-03	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV3	3507	SAR	2011/03/16 * 12
MRENT-82	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3540	SAR	2011/07/21 * 12
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	509	SAR	2011/07/20 * 12
COTS-MSAR-03	Dasy5	Schmid&Partner Engineering AG	DASY52.6.1.408	-	SAR	-
COTS-MSAR-02	S-Parameter Network Analyzer	Agilent	-	-	SAR	-
MDA-05	Dipole Antenna	Schmid&Partner Engineering AG	D900V2	155	SAR	2010/12/06 * 12
MDA-06	Dipole Antenna	Schmid&Partner Engineering AG	D1800V2	2d040	SAR	2010/12/09 * 12
MPSAM-02	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1333	SAR	Pre Check
MPF-02	2mmOval Flat Phantom ERI 4.0	Schmid&Partner Engineering AG	QD VA 001B (ERI4.0)	1045	SAR	2011/04/01 * 12
MDH-01	Device holder	Schmid&Partner Engineering AG	Mounting device for transmitter	-	SAR	Pre Check
MOS-26	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q29	SAR	2011/05/26 * 12
MOS-10	Digital thermometer	HANNA	Checktemp-2	MOS-10	SAR	2011/08/22 * 12
MBM-13	Barometer	Sunoh	SBR121	837	SAR	2011/03/14 * 36
HSL/MSL900					Daily check	Target value \pm 5%
HSL/MSL1800					Daily check	Target value \pm 5%
SAR room					Daily check	Ambient Noise<0.012W/kg

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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