



Test report No. : 32FE0253-HO-Q-R3  
Page : 1 of 145  
FCC ID : A3LGTP5100  
Issued date : February 27, 2012  
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# SAR TEST REPORT


**Test Report No. : 32FE0253-HO-Q-R3**

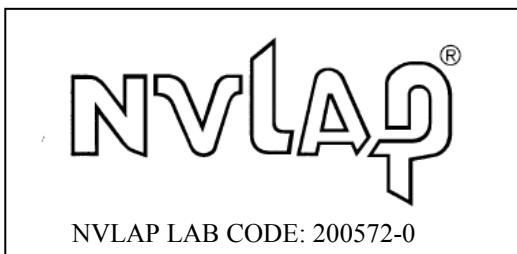
**Applicant** : SAMSUNG ELECTRONICS CO., LTD.  
**Type of Equipment** : GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5 Tablet with 802.11bgn, BT3.0+EDR  
**Model No.** : GT-P5100  
**FCC ID** : A3LGTP5100  
**Test regulation** : FCC47CFR 2.1093  
FCC OET Bulletin 65, Supplement C (Edition 01-01)  
**Test Result** : **Complied**  
FCC Part 22H Body : 0.833W/kg  
FCC Part 24E Body : 1.15W/kg  
FCC Part 15C Body : 0.509W/kg

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3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This report is a revised version of 32FE0253-HO-Q-R2. 32FE0253-HO-Q-R2 is replaced with this report.

**Date of test:** February 8 to 16, 2012

**Representative test engineer:**   
Hisayoshi Sato  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**   
Takahiro Hatakeda  
Leader of WiSE Japan  
UL Verification Service



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. \*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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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	GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5 Tablet with 802.11bgn, BT3.0+EDR
Model No.	GT-P5100
Serial No.	R31C10LKEZH, R31C10LKEOW, R32C200S11T, R32C200S12B
Rating	DC5.0V (USB Power Supply) Li-ion Battery (M/N; SP3676B1A(1S2P)) DC3.7V/7000mAh, 25.9Wh
Option Battery	N/A
Body-worn Accessory	Ear phone (typical)
Device category	Portable
Antenna to antenna separation distance	156.72mm from WWAN antenna to WLAN/BT antenna
Simultaneous transmission	WWAN can transmit simultaneously with WLAN WWAN can transmit simultaneously with Bluetooth WLAN cannot transmit simultaneously with Bluetooth

## 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	-0.31 dBi (MAX)

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Antenna Type	PIFA
Antenna Gain	-0.31 dBi (MAX)

#### **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
Emission Designator	GSM850: 249KGXW, 256KG7W PCS: 249KGXW, 262KG7W
Antenna Type	PIFA
Antenna Gain	GSM850: 824-849MHz: -4.63dBi (MAX) 869-894MHz: -2.35dBi (MAX) PCS: 1850-1910MHz: -5.1dBi (MAX) 1930-1990MHz: -5.55dBi (MAX)

#### **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
Emission Designator	Band V: 4M06F9W Band II: 4M06R9W
Antenna Type	PIFA
Antenna Gain	Band V: 824-849MHz: -4.63dBi (MAX) 869-894MHz: -2.35dBi (MAX) Band II: 1850-1910MHz: -5.1dBi (MAX) 1930-1990MHz: -5.55dBi (MAX)

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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;

- KDB450824 D01** SAR Prob Cal and Ver Meas v01r01
- KDB450824 D01** Dipole SAR Validation Verification v01
- KDB447498D01(v04)** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
- KDB447498D02(v02)** SAR Measurement Procedures for USB Dongle Transmitters
- 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
- KDB941225D05(v01)** SAR for LTE Devices
- KDB941225D06(v01)** SAR test procedures for devices incorporating SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities (Hot Spot SAR)
- KDB941225D07(v01)** SAR Evaluation Procedures for UMPC Mini-Tablet Devices
- KDB 616217 D01(v01r01)** SAR Evaluation Considerations for Laptop Computer with antennas Built-in on Display Screen
- KDB 616217 D03(v01)** SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet
- KDB865664** SAR Measurement Requirements for 3 to 6 GHz
- KDB248227(rev.1.2)** SAR Measurement Procedures for 802.11a/b/g Transmitters

#### 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
	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 < 60/f(GHz) mW and the antenna of Bluetooth is ≥ 5.0 cm from other antennas.

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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><b>NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE SPATIAL PEAK(averaged over any 1g of tissue) LIMIT 1.6 W/kg</b></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	Note
1	WWAN	GSM :850MH,1900MHz	No*1	-
2		GPRS/EGPRS :850MHz,1900MHz	No*1	Yes*3 Supported Hotspot
3		AMR/12.2kRMC : Band V,Band II	No*1	-
4		12.2kRMC,HSPA: BandV, BandII	No*1	Yes*3 Supported Hotspot
5	WLAN	WLAN 2.4G	No*1	Yes*3 Supported Hotspot
6	Bluetooth	Bluetooth BDR/EDR	Exemption*2	-

Note

\*1 The VOIP mode support but has no acoustic output in the phone.

\*2 Bluetooth mode is excluded from SAR test since power was  $< 60/f(\text{GHz}) \text{ mW}$  and the antenna of Bluetooth is  $\geq 5.0 \text{ cm}$  from other antennas.

\*3 Body SAR for hotspot mode is not required because the diagonal dimension of EUT exceeds 20cm and has not been considered for FCC equipment certification.

Mode	1g Head SAR [W/kg]	1g BodySAR [W/kg]
GSM850	No	0.833
PCS1900	No	0.790
WCDMA band V	No	0.605
WCDMA band II	No	1.150
WLAN 11b/g/n(2.4G)	No	0.509
Bluetooth	No	

### 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, and the following simultaneous transmission is possible.

No.	Capable Tx configurations	Head SAR	Body SAR	Note
1	WWAN+WLAN	GSM + WLAN2.4G	-	-
2		GPRS + WLAN2.4G	-	Yes -
3		12.2kRMC +WLAN2.4G	-	Yes -
4	WWAN+Bluetooth	Exemption		
5	WLAN+Bluetooth			

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## &lt;WWAN + WLAN &gt;

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

Step1.	WWAN antenna is >5cm from Wireless LAN antenna
Step2.	WLAN power > $2P_{\text{Pref}} (=60/f_{\text{GHz}})$
Step3.	Stand-alone SAR for WLAN
Step4.	Simultaneous transmission is possible (WWAN + WLAN)
Step5.	$\sum 1g \text{ SAR (WWAN + WLAN)} < 1.6\text{W/kg}$ Body:1.342W/kg
Step6.	No simultaneous transmission.

## &lt;WWAN + Bluetooth &gt;

Simultaneous transmitter evaluation based on the KDB648474.

Step1.	WWAN antenna is >5cm from Bluetooth antenna
Step2.	Bluetooth power < $2P_{\text{Pref}} (=60/f_{\text{GHz}})$
Step3.	No stand-alone SAR for Bluetooth
Step4.	No simultaneous transmission SAR

\*Antenna for WLAN and Bluetooth transmitting is the same and they are not transmitted simultaneously.

## SECTION 5 : Description of the operating mode

### 5.1 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)	
<b>WWAN</b>			
<p>The communication link was set up with the Wireless Communications Test Set (Agilent). The EUT was command to operate at maximum transmit power.</p> <p>GSM850 :PCL 5 PCS1900 :PCL 0 W-CDMA :All up bits</p>			

Mode	Duty cycle	Frequency Band	Test Frequency	Modulation
IEEE802.11b	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	DSSS (DBPSK.DQPSK.CCK)
IEEE802.11g	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	OFDM (BPSK.QPSK.16QAM,64QAM)
IEEE802.11n20 (2.4G)	100%	2412-2462MHz	2412MHz (1ch) 2437MHz(6ch) 2462MHz(11ch)	
Bluetooth	72%(DH5)	2402-2480MHz	2402MHz(1ch) 2441MHz(39ch) 2480MHz(79ch)	FHSS (GFSK, $\pi$ /4DQPSK,8DPSK)
<b>WLAN</b>				
<p>*Power of the EUT was set by the software as follows; H/W version: Rev 1.0 S/W version: P5100.001 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p>				

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## 5.2 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

1) GSM850 (Normal mode)

GSM850 SAR Power (Normal)											
Mode		Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Average frame power		
					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	-2.48	23.39	1.50	22.41	26.45	5.73	32.18
			190	836.6	-2.52	23.40	1.50	22.38	26.41	5.74	32.15
			251	848.8	-1.92	23.40	1.50	22.98	27.02	5.74	32.76
GPRS (CS1)	1slot	8.3	128	824.2	-2.59	23.39	1.50	22.30	26.44	5.73	32.17
			190	836.6	-2.55	23.40	1.50	22.35	26.41	5.74	32.15
			251	848.8	-2.03	23.40	1.50	22.87	27.02	5.74	32.76
	2slots	4.2	128	824.2	-2.05	23.39	1.50	22.84	24.02	5.73	29.75
			190	836.6	-2.09	23.40	1.50	22.81	23.97	5.74	29.71
			251	848.8	-1.48	23.40	1.50	23.42	24.57	5.74	30.31
	3slots	2.8	128	824.2	-2.17	23.39	1.50	22.72	22.08	5.73	27.81
			190	836.6	-2.30	23.40	1.50	22.60	21.97	5.74	27.71
			251	848.8	-1.73	23.40	1.50	23.17	22.56	5.74	28.30
	4slots	2.1	128	824.2	-1.42	23.39	1.50	23.47	21.57	5.73	27.30
			190	836.6	-1.48	23.40	1.50	23.42	21.53	5.74	27.27
			251	848.8	-0.93	23.40	1.50	23.97	22.10	5.74	27.84
EGPRS (MCS1)	1slot	8.3	128	824.2	-2.58	23.39	1.50	22.31	26.42	5.73	32.15
			190	836.6	-2.65	23.40	1.50	22.25	26.33	5.74	32.07
			251	848.8	-1.99	23.40	1.50	22.91	26.95	5.74	32.69
	2slots	4.2	128	824.2	-2.03	23.39	1.50	22.86	24.04	5.73	29.77
			190	836.6	-2.10	23.40	1.50	22.80	23.92	5.74	29.66
			251	848.8	-1.40	23.40	1.50	23.50	24.53	5.74	30.27
	3slots	2.8	128	824.2	-2.21	23.39	1.50	22.68	22.05	5.73	27.78
			190	836.6	-2.31	23.40	1.50	22.59	21.91	5.74	27.65
			251	848.8	-1.71	23.40	1.50	23.19	22.50	5.74	28.24
	4slots	2.1	128	824.2	-1.49	23.39	1.50	23.40	21.50	5.73	27.23
			190	836.6	-1.49	23.40	1.50	23.41	21.44	5.74	27.18
			251	848.8	-0.94	23.40	1.50	23.96	22.05	5.74	27.79
EGPRS (MCS5)	1slot	8.3	128	824.2	-8.15	23.39	1.50	16.74	20.90	5.73	26.63
			190	836.6	-8.20	23.40	1.50	16.70	20.82	5.74	26.56
			251	848.8	-7.62	23.40	1.50	17.28	21.41	5.74	27.15
	2slots	4.2	128	824.2	-5.13	23.39	1.50	19.76	21.00	5.73	26.73
			190	836.6	-5.16	23.40	1.50	19.74	20.91	5.74	26.65
			251	848.8	-4.48	23.40	1.50	20.42	21.53	5.74	27.27
	3slots	2.8	128	824.2	-3.26	23.39	1.50	21.63	21.02	5.73	26.75
			190	836.6	-3.33	23.40	1.50	21.57	20.94	5.74	26.68
			251	848.8	-2.77	23.40	1.50	22.13	21.54	5.74	27.28
	4slots	2.1	128	824.2	-5.04	23.39	1.50	19.85	18.06	5.73	23.79
			190	836.6	-5.14	23.40	1.50	19.76	17.98	5.74	23.72
			251	848.8	-4.51	23.40	1.50	20.39	18.60	5.74	24.34

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)

GSM850 SAR Power (Power reduction)											
Mode	Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Average frame power			
				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	-7.07	23.39	1.50	17.82	21.61	5.73	27.34
			190	836.6	-7.22	23.40	1.50	17.68	21.51	5.74	27.25
			251	848.8	-6.69	23.40	1.50	18.21	22.10	5.74	27.84
GPRS (CS1)	1slot	8.3	128	824.2	-7.38	23.39	1.50	17.51	21.60	5.73	27.33
			190	836.6	-7.44	23.40	1.50	17.46	21.51	5.74	27.25
			251	848.8	-6.82	23.40	1.50	18.08	22.10	5.74	27.84
	2slots	4.2	128	824.2	-6.82	23.39	1.50	18.07	19.16	5.73	24.89
			190	836.6	-6.86	23.40	1.50	18.04	19.08	5.74	24.82
			251	848.8	-6.30	23.40	1.50	18.60	19.65	5.74	25.39
	3slots	2.8	128	824.2	-7.09	23.39	1.50	17.80	17.09	5.73	22.82
			190	836.6	-7.13	23.40	1.50	17.77	17.00	5.74	22.74
			251	848.8	-6.53	23.40	1.50	18.37	17.61	5.74	23.35
	4slots	2.1	128	824.2	-6.35	23.39	1.50	18.54	16.60	5.73	22.33
			190	836.6	-6.38	23.40	1.50	18.52	16.54	5.74	22.28
			251	848.8	-5.80	23.40	1.50	19.10	17.10	5.74	22.84
EGPRS (MCS1)	1slot	8.3	128	824.2	-7.32	23.39	1.50	17.57	21.59	5.73	27.32
			190	836.6	-7.43	23.40	1.50	17.47	21.50	5.74	27.24
			251	848.8	-6.84	23.40	1.50	18.06	22.09	5.74	27.83
	2slots	4.2	128	824.2	-6.79	23.39	1.50	18.10	19.16	5.73	24.89
			190	836.6	-6.88	23.40	1.50	18.02	19.08	5.74	24.82
			251	848.8	-6.31	23.40	1.50	18.59	19.65	5.74	25.39
	3slots	2.8	128	824.2	-7.10	23.39	1.50	17.79	17.09	5.73	22.82
			190	836.6	-7.13	23.40	1.50	17.77	17.00	5.74	22.74
			251	848.8	-6.53	23.40	1.50	18.37	17.61	5.74	23.35
	4slots	2.1	128	824.2	-6.36	23.39	1.50	18.53	16.60	5.73	22.33
			190	836.6	-6.39	23.40	1.50	18.51	16.53	5.74	22.27
			251	848.8	-5.84	23.40	1.50	19.06	17.10	5.74	22.84
EGPRS (MCS5)	1slot	8.3	128	824.2	-11.54	23.39	1.50	13.35	17.61	5.73	23.34
			190	836.6	-11.55	23.40	1.50	13.35	17.56	5.74	23.30
			251	848.8	-10.99	23.40	1.50	13.91	18.11	5.74	23.85
	2slots	4.2	128	824.2	-8.47	23.39	1.50	16.42	17.71	5.73	23.44
			190	836.6	-8.51	23.40	1.50	16.39	17.63	5.74	23.37
			251	848.8	-7.95	23.40	1.50	16.95	18.17	5.74	23.91
	3slots	2.8	128	824.2	-6.68	23.39	1.50	18.21	17.72	5.73	23.45
			190	836.6	-6.75	23.40	1.50	18.15	17.64	5.74	23.38
			251	848.8	-6.13	23.40	1.50	18.77	18.23	5.74	23.97
	4slots	2.1	128	824.2	-8.57	23.39	1.50	16.32	14.92	5.73	20.65
			190	836.6	-8.56	23.40	1.50	16.34	14.91	5.74	20.65
			251	848.8	-8.00	23.40	1.50	16.90	15.36	5.74	21.10

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)

PCS1900 SAR Power (Normal)											
Mode		Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Average frame power		
					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	-6.33	23.42	2.10	19.19	22.00	6.67	28.67
			661	1880.0	-6.20	23.42	2.10	19.32	22.23	6.66	28.89
			810	1909.8	-6.47	23.41	2.10	19.04	21.94	6.67	28.61
GPRS (CS1)	1slot	8.3	512	1850.2	-6.55	23.42	2.10	18.97	22.00	6.67	28.67
			661	1880.0	-6.33	23.42	2.10	19.19	22.22	6.66	28.88
			810	1909.8	-6.66	23.41	2.10	18.85	21.92	6.67	28.59
	2slots	4.2	512	1850.2	-5.91	23.42	2.10	19.61	19.63	6.67	26.30
			661	1880.0	-5.72	23.42	2.10	19.80	19.85	6.66	26.51
			810	1909.8	-6.03	23.41	2.10	19.48	19.56	6.67	26.23
	3slots	2.8	512	1850.2	-5.70	23.42	2.10	19.82	18.10	6.67	24.77
			661	1880.0	-5.48	23.42	2.10	20.04	18.32	6.66	24.98
			810	1909.8	-5.72	23.41	2.10	19.79	18.02	6.67	24.69
	4slots	2.1	512	1850.2	-5.89	23.42	2.10	19.63	16.63	6.67	23.30
			661	1880.0	-5.71	23.42	2.10	19.81	16.85	6.66	23.51
			810	1909.8	-6.02	23.41	2.10	19.49	16.54	6.67	23.21
EGPRS (MCS1)	1slot	8.3	512	1850.2	-6.55	23.42	2.10	18.97	22.00	6.67	28.67
			661	1880.0	-6.33	23.42	2.10	19.19	22.21	6.66	28.87
			810	1909.8	-6.66	23.41	2.10	18.85	21.92	6.67	28.59
	2slots	4.2	512	1850.2	-5.92	23.42	2.10	19.60	19.62	6.67	26.29
			661	1880.0	-5.69	23.42	2.10	19.83	19.85	6.66	26.51
			810	1909.8	-6.03	23.41	2.10	19.48	19.54	6.67	26.21
	3slots	2.8	512	1850.2	-5.69	23.42	2.10	19.83	18.08	6.67	24.75
			661	1880.0	-5.49	23.42	2.10	20.03	18.31	6.66	24.97
			810	1909.8	-5.80	23.41	2.10	19.71	18.02	6.67	24.69
	4slots	2.1	512	1850.2	-5.91	23.42	2.10	19.61	16.63	6.67	23.30
			661	1880.0	-5.71	23.42	2.10	19.81	16.84	6.66	23.50
			810	1909.8	-6.02	23.41	2.10	19.49	16.54	6.67	23.21
EGPRS (MCS5)	1slot	8.3	512	1850.2	-9.24	23.42	2.10	16.28	19.37	6.67	26.04
			661	1880.0	-9.02	23.42	2.10	16.50	19.57	6.66	26.23
			810	1909.8	-9.29	23.41	2.10	16.22	19.31	6.67	25.98
	2slots	4.2	512	1850.2	-6.18	23.42	2.10	19.34	19.50	6.67	26.17
			661	1880.0	-5.98	23.42	2.10	19.54	19.71	6.66	26.37
			810	1909.8	-6.27	23.41	2.10	19.24	19.43	6.67	26.10
	3slots	2.8	512	1850.2	-5.35	23.42	2.10	20.17	18.51	6.67	25.18
			661	1880.0	-5.11	23.42	2.10	20.41	18.74	6.66	25.40
			810	1909.8	-5.38	23.41	2.10	20.13	18.48	6.67	25.15
	4slots	2.1	512	1850.2	-6.12	23.42	2.10	19.40	16.47	6.67	23.14
			661	1880.0	-5.94	23.42	2.10	19.58	16.70	6.66	23.36
			810	1909.8	-6.24	23.41	2.10	19.27	16.41	6.67	23.08

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)

PCS1900 SAR Power (Power reduction)												
Mode		Crest Factor (typical)	Ch	Frequency [MHz]	Time-based AVG				Average frame power			
					P/M Reading [dBm] Time-AVG	Atten. [dB]	Cable Loss [dB]	Result [dBm] Time-AVG	Agilent Reading [dBm] slotted AVG	Cable Loss [dB]	Result [dBm] Slotted AVG	
GSM	1slot	8.3	512	1850.2	-12.34	23.42	2.10	13.18	15.92	6.67	22.59	
			661	1880.0	-12.05	23.42	2.10	13.47	16.24	6.66	22.90	
			810	1909.8	-12.54	23.41	2.10	12.97	15.83	6.67	22.50	
GPRS (CS1)	1slot	8.3	512	1850.2	-12.56	23.42	2.10	12.96	15.91	6.67	22.58	
			661	1880.0	-12.28	23.42	2.10	13.24	16.23	6.66	22.89	
			810	1909.8	-12.70	23.41	2.10	12.81	15.83	6.67	22.50	
	2slots	4.2	512	1850.2	-12.10	23.42	2.10	13.42	13.41	6.67	20.08	
			661	1880.0	-11.77	23.42	2.10	13.75	13.73	6.66	20.39	
			810	1909.8	-12.20	23.41	2.10	13.31	13.33	6.67	20.00	
	3slots	2.8	512	1850.2	-11.88	23.42	2.10	13.64	11.88	6.67	18.55	
			661	1880.0	-11.53	23.42	2.10	13.99	12.22	6.66	18.88	
			810	1909.8	-11.96	23.41	2.10	13.55	11.82	6.67	18.49	
	4slots	2.1	512	1850.2	-12.18	23.42	2.10	13.34	10.37	6.67	17.04	
			661	1880.0	-11.79	23.42	2.10	13.73	10.71	6.66	17.37	
			810	1909.8	-12.30	23.41	2.10	13.21	10.29	6.67	16.96	
EGPRS (MCS1)	1slot	8.3	512	1850.2	-12.53	23.42	2.10	12.99	15.91	6.67	22.58	
			661	1880.0	-12.27	23.42	2.10	13.25	16.21	6.66	22.87	
			810	1909.8	-12.70	23.41	2.10	12.81	15.82	6.67	22.49	
	2slots	4.2	512	1850.2	-12.10	23.42	2.10	13.42	13.41	6.67	20.08	
			661	1880.0	-11.76	23.42	2.10	13.76	13.73	6.66	20.39	
			810	1909.8	-12.16	23.41	2.10	13.35	13.33	6.67	20.00	
	3slots	2.8	512	1850.2	-11.88	23.42	2.10	13.64	11.88	6.67	18.55	
			661	1880.0	-11.54	23.42	2.10	13.98	12.22	6.66	18.88	
			810	1909.8	-11.97	23.41	2.10	13.54	11.81	6.67	18.48	
	4slots	2.1	512	1850.2	-12.11	23.42	2.10	13.41	10.36	6.67	17.03	
			661	1880.0	-11.83	23.42	2.10	13.69	10.71	6.66	17.37	
			810	1909.8	-12.24	23.41	2.10	13.27	10.27	6.67	16.94	
EGPRS (MCS5)	1slot	8.3	512	1850.2	-13.88	23.42	2.10	11.64	14.63	6.67	21.30	
			661	1880.0	-13.56	23.42	2.10	11.96	14.96	6.66	21.62	
			810	1909.8	-13.95	23.41	2.10	11.56	14.60	6.67	21.27	
	2slots	4.2	512	1850.2	-10.88	23.42	2.10	14.64	14.76	6.67	21.43	
			661	1880.0	-10.56	23.42	2.10	14.96	15.07	6.66	21.73	
			810	1909.8	-10.93	23.41	2.10	14.58	14.72	6.67	21.39	
	3slots	2.8	512	1850.2	-10.09	23.42	2.10	15.43	13.77	6.67	20.44	
			661	1880.0	-9.78	23.42	2.10	15.74	14.08	6.66	20.74	
			810	1909.8	-10.15	23.41	2.10	15.36	13.73	6.67	20.40	
	4slots	2.1	512	1850.2	-10.81	23.42	2.10	14.71	11.81	6.67	18.48	
			661	1880.0	-10.47	23.42	2.10	15.05	12.11	6.66	18.77	
			810	1909.8	-10.86	23.41	2.10	14.65	11.78	6.67	18.45	

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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**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:  $\beta$  values for transmitter characteristics tests with HS-DPCCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c \beta_d$	$\beta_{HS}$ (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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  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,  $\Delta_{ACK}$  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
						$\beta_c$	$\beta_d$			
	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						
	$\Delta_{ACK}$	$\Delta_{NACK}$	$\Delta_{CQI}$	Ack-Nack repetition factor	CQI Feedback	CQI Repetition Factor	A <sub>HS</sub> = $\beta_{HS}/\beta_c$
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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5) WCDMA V (Normal mode/ Power reduction 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	20.72	1.50	22.22	15.01	1.50	16.51
	4183	836.6	20.56	1.50	22.06	14.98	1.50	16.48
	4233	846.6	20.67	1.50	22.17	15.01	1.50	16.51
RMC 12.2kbps	4132	826.4	20.73	1.50	22.23	15.01	1.50	16.51
	4183	836.6	20.56	1.50	22.06	14.98	1.50	16.48
	4233	846.6	20.67	1.50	22.17	15.01	1.50	16.51
HSDPA Subtest1	4132	826.4	20.48	1.50	21.98	14.95	1.50	16.45
	4183	836.6	20.38	1.50	21.88	14.89	1.50	16.39
	4233	846.6	20.46	1.50	21.96	14.97	1.50	16.47
HSDPA Subtest2	4132	826.4	20.23	1.50	21.73	14.96	1.50	16.46
	4183	836.6	20.11	1.50	21.61	14.88	1.50	16.38
	4233	846.6	20.20	1.50	21.70	14.97	1.50	16.47
HSDPA Subtest3	4132	826.4	19.98	1.50	21.48	14.96	1.50	16.46
	4183	836.6	19.86	1.50	21.36	14.87	1.50	16.37
	4233	846.6	19.96	1.50	21.46	14.97	1.50	16.47
HSDPA Subtest4	4132	826.4	19.73	1.50	21.23	14.94	1.50	16.44
	4183	836.6	19.61	1.50	21.11	14.85	1.50	16.35
	4233	846.6	19.71	1.50	21.21	14.96	1.50	16.46
HSUPA Subtest1	4132	826.4	20.09	1.50	21.59	13.97	1.50	15.47
	4183	836.6	19.61	1.50	21.11	13.75	1.50	15.25
	4233	846.6	20.16	1.50	21.66	13.92	1.50	15.42
HSUPA Subtest2	4132	826.4	18.36	1.50	19.86	13.46	1.50	14.96
	4183	836.6	18.19	1.50	19.69	13.38	1.50	14.88
	4233	846.6	18.30	1.50	19.80	13.44	1.50	14.94
HSUPA Subtest3	4132	826.4	19.32	1.50	20.82	14.26	1.50	15.76
	4183	836.6	19.18	1.50	20.68	14.17	1.50	15.67
	4233	846.6	19.30	1.50	20.80	14.30	1.50	15.80
HSUPA Subtest4	4132	826.4	18.50	1.50	20.00	13.68	1.50	15.18
	4183	836.6	18.39	1.50	19.89	13.60	1.50	15.10
	4233	846.6	18.49	1.50	19.99	13.67	1.50	15.17
HSUPA Subtest5	4132	826.4	20.05	1.50	21.55	13.93	1.50	15.43
	4183	836.6	19.91	1.50	21.41	13.85	1.50	15.35
	4233	846.6	20.00	1.50	21.50	13.94	1.50	15.44

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)

WCDMA II band								
Mode	Ch	Normal				Power reduction		
		Frequency [MHz]	Reading AVG [dBm]	Cable [dB]	Result [dBm]	Reading AVG [dBm]	Cable [dB]	Result [dBm]
AMR	9262	1852.4	19.64	2.10	21.74	12.32	2.10	14.42
	9400	1880.0	19.51	2.10	21.61	12.46	2.10	14.56
	9538	1907.6	19.44	2.10	21.54	12.44	2.10	14.54
RMC 12.2kbps	9262	1852.4	19.64	2.10	21.74	12.32	2.10	14.42
	9400	1880.0	19.51	2.10	21.61	12.46	2.10	14.56
	9538	1907.6	19.44	2.10	21.54	12.44	2.10	14.54
HSDPA Subtest1	9262	1852.4	19.56	2.10	21.66	12.16	2.10	14.26
	9400	1880.0	19.47	2.10	21.57	12.39	2.10	14.49
	9538	1907.6	19.41	2.10	21.51	12.39	2.10	14.49
HSDPA Subtest2	9262	1852.4	19.56	2.10	21.66	11.88	2.10	13.98
	9400	1880.0	19.43	2.10	21.53	12.10	2.10	14.20
	9538	1907.6	19.37	2.10	21.47	12.11	2.10	14.21
HSDPA Subtest3	9262	1852.4	19.56	2.10	21.66	11.63	2.10	13.73
	9400	1880.0	19.42	2.10	21.52	11.83	2.10	13.93
	9538	1907.6	19.35	2.10	21.45	11.84	2.10	13.94
HSDPA Subtest4	9262	1852.4	19.30	2.10	21.40	11.35	2.10	13.45
	9400	1880.0	19.17	2.10	21.27	11.56	2.10	13.66
	9538	1907.6	19.10	2.10	21.20	11.57	2.10	13.67
HSUPA Subtest1	9262	1852.4	18.33	2.10	20.43	11.18	2.10	13.28
	9400	1880.0	18.39	2.10	20.49	11.30	2.10	13.40
	9538	1907.6	18.39	2.10	20.49	11.41	2.10	13.51
HSUPA Subtest2	9262	1852.4	17.81	2.10	19.91	9.69	2.10	11.79
	9400	1880.0	17.64	2.10	19.74	9.87	2.10	11.97
	9538	1907.6	17.62	2.10	19.72	9.88	2.10	11.98
HSUPA Subtest3	9262	1852.4	18.57	2.10	20.67	10.79	2.10	12.89
	9400	1880.0	18.59	2.10	20.69	10.93	2.10	13.03
	9538	1907.6	18.51	2.10	20.61	11.00	2.10	13.10
HSUPA Subtest4	9262	1852.4	18.07	2.10	20.17	10.01	2.10	12.11
	9400	1880.0	17.90	2.10	20.00	10.14	2.10	12.24
	9538	1907.6	17.81	2.10	19.91	10.19	2.10	12.29
HSUPA Subtest5	9262	1852.4	18.54	2.10	20.64	11.08	2.10	13.18
	9400	1880.0	18.45	2.10	20.55	11.28	2.10	13.38
	9538	1907.6	18.45	2.10	20.55	11.90	2.10	14.00

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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**Output power measurement for WLAN**

7) WLAN (11b/g/n(2.4G))

**[IEEE802.11b] Rate Check**

Rate [Mbps]	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
1.0	2437	8.68	5.69	2.37	9.99	21.04	18.05	127.06	63.83
2.0	2437	8.67	5.67	2.37	9.99	21.03	18.03	126.77	63.53
5.5	2437	8.60	5.62	2.37	9.99	20.96	17.98	124.74	62.81
11.0	2437	8.77	5.39	2.37	9.99	21.13	17.75	129.72	59.57

:Worst data rate

**IEEE802.11b 1Mbps(AV Worst)**

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
1	2412	8.54	5.67	2.37	9.99	20.90	18.03	123.03	63.53
6	2437	8.68	5.69	2.37	9.99	21.04	18.05	127.06	63.83
11	2462	8.47	5.60	2.37	9.99	20.83	17.96	121.06	62.52

:SAR test channel

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

**[IEEE802.11g] Rate Check**

Rate [Mbps]	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
6.0	2437	13.32	2.65	2.37	9.99	25.68	15.01	369.83	31.70
9.0	2437	13.30	2.47	2.37	9.99	25.66	14.83	368.13	30.41
12.0	2437	12.25	2.42	2.37	9.99	24.61	14.78	289.07	30.06
18.0	2437	13.00	2.06	2.37	9.99	25.36	14.42	343.56	27.67
24.0	2437	12.96	1.82	2.37	9.99	25.32	14.18	340.41	26.18
36.0	2437	13.11	1.39	2.37	9.99	25.47	13.75	352.37	23.71
48.0	2437	13.31	1.07	2.37	9.99	25.67	13.43	368.98	22.03
54.0	2437	13.06	0.93	2.37	9.99	25.42	13.29	348.34	21.33

:Worst data rate

**IEEE802.11g 6Mbps**

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
1	2412	13.25	2.68	2.37	9.99	25.61	15.04	363.92	31.92
6	2437	13.26	2.65	2.37	9.99	25.62	15.01	364.75	31.70
11	2462	13.45	2.54	2.37	9.99	25.81	14.90	381.07	30.90

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**[IEEE802.11n-20] Rate Check**

Rate	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
MCS0	2437	11.20	0.27	2.37	9.99	23.56	12.63	226.99	18.32
MCS1	2437	11.18	-0.05	2.37	9.99	23.54	12.31	225.94	17.02
MCS2	2437	11.01	-0.26	2.37	9.99	23.37	12.10	217.27	16.22
MCS3	2437	10.95	-0.46	2.37	9.99	23.31	11.90	214.29	15.49
MCS4	2437	11.08	-0.85	2.37	9.99	23.44	11.51	220.80	14.16
MCS5	2437	10.81	-1.21	2.37	9.99	23.17	11.15	207.49	13.03
MCS6	2437	11.01	-1.28	2.37	9.99	23.37	11.08	217.27	12.82
MCS7	2437	11.08	-1.55	2.37	9.99	23.44	10.81	220.80	12.05

Worst data rate

**IEEE802.11n-20 MCS0**

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
1	2412	11.17	0.35	2.37	9.99	23.53	12.71	225.42	18.66
6	2437	11.20	0.27	2.37	9.99	23.56	12.63	226.99	18.32
11	2462	11.18	0.22	2.37	9.99	23.54	12.58	225.94	18.11

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

**Output power measurement for Bluetooth**

8) Bluetooth

**Bluetooth**

Mode	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
DH5	2402	-1.75	-3.17	6.82	10.07	15.14	13.72	32.66	23.55
	2441	-1.90	-3.28	6.85	10.07	15.02	13.64	31.77	23.12
	2480	-2.45	-3.86	6.87	10.07	14.49	13.08	28.12	20.32
2DH5	2402	-1.66	-5.14	6.82	10.07	15.23	11.75	33.34	14.96
	2441	-1.81	-5.11	6.85	10.07	15.11	11.81	32.43	15.17
	2480	-2.36	-5.76	6.87	10.07	14.58	11.18	28.71	13.12
3DH5	2402	-1.36	-5.14	6.82	10.07	15.53	11.75	35.73	14.96
	2441	-1.53	-5.11	6.85	10.07	15.39	11.81	34.59	15.17
	2480	-2.06	-5.75	6.87	10.07	14.88	11.19	30.76	13.15

Sample Calculation: Result = Reading + Cable Loss + Attenuator

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### 5.3 Detail for Power Reduction and sensor recognition distance

Mode	Average power reduction results	Tolerance
	[dB]	[dB]
GSM850 GSM/GPRS(SC1)/EGPRS(MCS1)	4.81	4.8 +/-2
GSM850 EGPRS(MCS)	4.12	3.5 +/-2
PCS1900 GSM/GPRS	6.10	5.5 +/-2
PCS1900 EGPRS	5.38	4.5 +/-2
WCDMA band V AMR/12.2k RMC	5.65	5.5 +/-2
WCDMA band V HSDPA/HSUPA	5.07	
WCDMA band II AMR/12.2k RMC	7.13	7.0 +/-2
WCDMA band II /HSDPA/HSUPA	7.23	
WLAN 11b/g/n	Power reduction is not implemented for WLAN	

### 5.4 SAR testing operating modes

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

#### SAR measurement for GSM and W-CDMA

Band	Crest factor	Mode	Test Frequency	Note
GSM850	2.1	GPRS (CS-1) 4 slots	824.2MHz (128ch) 836.6MHz(190ch) 848.8MHz(251ch)	*1
PCS1900	2.8	EGPRS (MCS5) 3 slots GPRS (CS-1) 3 slots EGPRS (MCS1) 3 slots	1880.0MHz(661ch)	*5
WCDMA V	1	12.2k RMC	826.4MHz (4132ch)	*2 *5
WCDMA II	1	12.2k RMC	1852.4MHz(9262ch) 1880.0MHz(9400ch) 1907.6MHz(9538ch)	*2

#### 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

**SAR measurement for WLAN**

Mode	Crest factor	Modulation	Test Frequency	Note
IEEE802.11b	1	DBPSK(1Mbps)	2437MHz(6ch)	*5
IEEE802.11g	Not required			*3
IEEE802.11n20 (2.4G)	Not required			*3
Bluetooth	Exemption			*4

**WLAN**

\*Power of the EUT was set by the software as follows;  
 H/W version: Rev 1.0  
 S/W version: P5100.001  
 \*This setting of software is the worst case.  
 Any conditions under the normal use do not exceed the condition of setting.  
 In addition, end users cannot change the settings of the output power of the product.

**Decision of SAR test channel**

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

Mode	GHz	Channel	Turbo Channel	"Default Test Channel"	
				FCC 15.247	
				802.11b	802.11g
802.11 b/g	2.412	1		√	Δ
	2.437	6	6	√	Δ
	2.462	11		√	Δ

√ = "default test channels"

Δ = Possible 802.11g channels with maximum average output 1/4 dB ≥ the "default test channels"

\*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.

\*2 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.

\*3 The 11b mode was maximum average power. The 11g/n 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 11b mode.

\*4 Bluetooth mode is excluded from SAR test since power was < 60/f(GHz) mW and the antenna of Bluetooth is ≥ 5.0 cm from other antennas.

\*5 The other channel was not required since maximum average output power channel SAR value is less than 0.8W/kg.

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## 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)

SAR power is equal to DATA of EMC test based on the following reason.

- EMC and SAR tests are performed with the same test sample such as serial number under the same condition.
- EMC and SAR tests are performed at the same laboratory.

<Peak power result for maximum data rate in FCC 15.247 test>

#### IEEE802.11b 11Mbps(PK Worst)

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
1	2412	8.87	5.46	2.37	9.99	21.23	17.82	132.74	60.53
6	2437	8.77	5.39	2.37	9.99	21.13	17.75	129.72	59.57
11	2462	8.68	5.38	2.37	9.99	21.04	17.74	127.06	59.43

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator}$$

## 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 measuring the e-field at the same location at beginning and the end of the scan measurement for each test position.

DASY5 system calculation Power drift value[dB] =  $20\log(E_a)/(E_b)$

Before SAR testing :  $E_b$ [V/m]

After SAR testing :  $E_a$ [V/m]

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

$$X[\text{dB}] = 10\log[P] = 10\log(1.05/1) = 10\log(1.05) - 10\log(1) = 0.212\text{dB}$$

from E-field relations with power.

$$p = E^2/\eta = E^2/377$$

Therefore, The correlation of power and the E-field

$$X_{\text{dB}} = 10\log(P) = 10\log(E^2) = 20\log(E)$$

Therefore,

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

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## SECTION6 : Description of the Body

### 6.1 Specification of sensor

This EUT has two grip sensors for power reduction. These sensors detect the human skin within 7mm from the rear case and 6mm from top edge of EUT.

Sensor specification			
Position	Yes/No	Type	Distance detected
Front	No	-	-
Rear	Yes	grip	7mm
Left edge	No	-	-
Right edge	No	-	-
Top edge	Yes	grip	6mm
Bottom edge	No	-	-

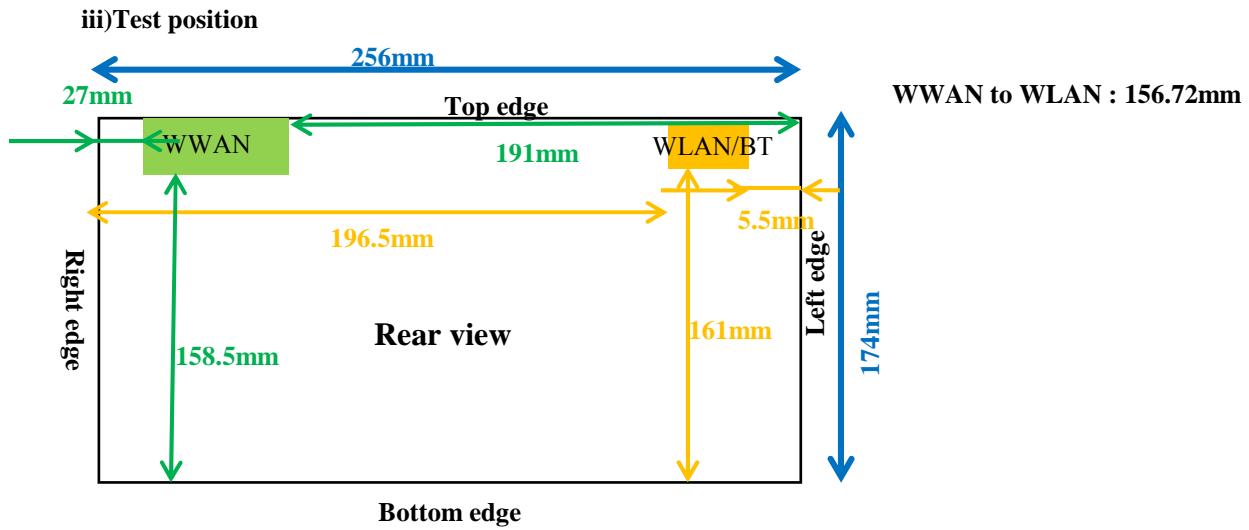
### 6.2 Description of the Body setup

#### i) Procedure for SAR testing

-The tested procedure was performed according to the KDB 447498 D01 (Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies)

#### ii) Test mode

<b>GSM850</b>	<b>Data transmission mode (GPRS)</b>
<b>PCS1900</b>	<b>Data transmission mode (GPRS,EGPRS)</b>
<b>WCDMA V/II</b>	<b>Data transmission mode (12.2kRMC)</b>
<b>WLAN</b>	<b>Data transmission mode (11b)</b>



<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.

<Test position>

Test position is required to the edge within 5cm from antenna, according to the KDB 447498 D01  
 Device dimensions (HxWxD):174x256x5

No.	Position	Test distance	WWAN			WLAN	
			Reduction on <input checked="" type="checkbox"/> /off <input type="checkbox"/>	Tested	Antenna	Tested	Antenna
1	Front	0mm	<input type="checkbox"/>	<input type="checkbox"/>	Fixed	<input type="checkbox"/>	Fixed
2	Rear	0mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input checked="" type="checkbox"/>	Fixed
3	Rear	7mm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input checked="" type="checkbox"/>	Fixed
4	Left edge	0mm	<input type="checkbox"/>	<input type="checkbox"/>	Fixed	<input checked="" type="checkbox"/>	Fixed
5	Right edge	0mm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input type="checkbox"/>	Fixed
6	Top edge	0mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input checked="" type="checkbox"/>	Fixed
7	Top edge	6mm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input type="checkbox"/>	Fixed
8	Bottom edge	0mm	<input type="checkbox"/>	<input type="checkbox"/>	Fixed	<input type="checkbox"/>	Fixed
9	Vertex Top	45deg.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fixed	<input type="checkbox"/>	Fixed

\*The power reduction for WLAN has not supported.

\*Rear 7mm for WLAN was tested for Simultaneous transmission evaluation because this position is worst mode in WWAN mode.

## 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.

Error Description	Uncertain value ±	Probability distribution	divisor	(ci) lg	Standard (lg)	vi or veff
<b>Measurement System</b>						
Probe calibration	± 6.00	Normal	1	1	± 6.00	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	0.7	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	0.7	± 3.9	∞
Boundary effects	± 1.0	Rectangular	√3	1	± 0.6	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	√3	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	√3	1	± 1.7	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Max.SAR Eval.	± 1.0	Rectangular	√3	1	± 0.6	∞
<b>Test Sample Related</b>						
Device positioning	± 2.9	Normal	1	1	± 2.9	33
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	6
Power drift	± 5.0	Rectangular	√3	1	± 2.9	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.64	± 1.8	∞
Liquid conductivity (meas.)	+ 2.1	Rectangular	1	0.64	+ 1.3	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (meas.)	- 4.8	Rectangular	1	0.6	- 2.9	∞
<b>Combined Standard Uncertainty</b>					± 11.231	
<b>Expanded Uncertainty (k=2)</b>					± 22.5	

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

Step1. The searching for the worst position

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

Step2. The changing to the channels (Mid, High)

The test was performed at the position that SAR value is more than 0.8W/kg.

Note:

1)The BODY SAR is not required for EGPRS mode because the maximum average output power for EGPRS mode is less than 1/4dB higher than that measured GPRS mode. The GPRS 4up mode was maximum based time average power. The power of other mode was lower than GPRS 4up 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 [%]
15-Feb	24	34	MSL 900	23.5	848.8	$\epsilon_r$	55.2	53.0	-3.9	+/-5
						$\sigma$ [mho/m]	0.97	0.98	0.8	+/-5
14-Feb	24	32	MSL 900	23.5	824.2	$\epsilon_r$	55.2	53.3	-3.4	+/-5
						$\sigma$ [mho/m]	0.97	0.95	-1.6	+/-5
14-Feb	24	32	MSL 900	23.5	836.6	$\epsilon_r$	55.2	53.2	-3.7	+/-5
						$\sigma$ [mho/m]	0.97	0.97	-0.4	+/-5

$\epsilon_r$ : Relative Permittivity /  $\sigma$  : Conductivity

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

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**(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	
<b>Step.1 Position searching</b>								
251	848.8	GPRS 4slots	Flat	Fixed	Front		Not required	
251	848.8	GPRS 4slots	Flat	Fixed	Rear	7	<b>0.443</b>	*1
251	848.8	GPRS 4slots	Flat	Fixed	Rear	0	<b>0.833</b>	*2
251	848.8	GPRS 4slots	Flat	Fixed	Right edge	0	<b>0.355</b>	*1
251	848.8	GPRS 4slots	Flat	Fixed	Left edge		Not required	
251	848.8	GPRS 4slots	Flat	Fixed	Top edge	6	<b>0.163</b>	*1
251	848.8	GPRS 4slots	Flat	Fixed	Top edge	0	<b>0.351</b>	*2
251	848.8	GPRS 4slots	Flat	Fixed	Bottom edge	0	Not required	
<b>Vertex position</b>								
251	848.8	GPRS 4slots	Flat	Fixed	Top vertex	Right 45 °	<b>0.037</b>	*1
<b>Step.3 Channel change ( SAR level in Step.1 &gt; 0.8 w/kg )</b>								
128	824.2	GPRS 4slots	Flat	Fixed	Worst	0	<b>0.832</b>	*2
190	836.6	GPRS 4slots	Flat	Fixed	Worst	0	<b>0.776</b>	*2

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.

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**8.2 PCS1900MHz Body SAR****(1)Method of measurement****<Body>**

Step1. The searching for the worst position

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

Step2. The change the mode

The test was performed at the worst condition of Step1.

Step3. The changing to the channels (Low, High)

The test was performed at the position that SAR value is more than 0.8W/kg.

Note:

1)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 [%]
8-Feb	24	33	MSL 1800	23.5	1880	$\epsilon_r$	53.3	50.7	-4.8	+/-5
						$\sigma$ [mho/m]	1.52	1.53	0.9	+/-5
9-Feb	24	34	MSL 1800	23.5	1880	$\epsilon_r$	53.3	50.8	-4.6	+/-5
						$\sigma$ [mho/m]	1.52	1.55	1.8	+/-5

$\epsilon_r$ : Relative Permittivity /  $\sigma$  : 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	
<b>Step.1 Position searching</b>								
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Front	-	Not required	
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Rear	7	<b>0.790</b>	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Rear	0	<b>0.388</b>	*2
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Right edge	0	<b>0.136</b>	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Left edge	-	Not required	
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top edge	6	<b>0.562</b>	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top edge	0	<b>0.265</b>	*2
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Bottom edge	-	Not required	
<b>Vertex position</b>								
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top vertex	Right 45 °	<b>0.240</b>	*1
<b>Step.2 Mode change</b>								
661	1880.0	GPRS 3slots	Flat	Fixed	Worst	7	<b>0.738</b>	*1
661	1880.0	EGPRS 3slots (GMSK)	Flat	Fixed	Worst	7	<b>0.741</b>	*1
<b>Step.3 Channel change ( SAR level in Step.1 &gt; 0.8 w/kg )</b>								
512	1850.2	EGPRS 3slots (8PSK)	Flat	Fixed	Worst	7	<b>Not required</b>	*1
810	1909.8	EGPRS 3slots (8PSK)	Flat	Fixed	Worst	7	<b>Not required</b>	*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.

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### 8.3 WCDMA Band V Body SAR

#### (1) Method of measurement

##### <Body>

Step1. The searching for the worst position

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

Note:

- 1) The BODY SAR is not required for HSPA mode because the maximum average output power for HSPA 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 [%]
14-Feb	24	32	MSL 900	23.5	826.4	$\epsilon_r$	55.2	55.9	1.3	+/-5
						$\sigma$ [mho/m]	0.97	0.95	-1.9	+/-5

$\epsilon_r$ : Relative Permittivity /  $\sigma$ : 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		
<b>Step.1 Position searching</b>									
4132	826.4	12.2k RMC	Flat	Fixed	Front		Not required		
4132	826.4	12.2k RMC	Flat	Fixed	Rear	7	<b>0.313</b>	*1	
4132	826.4	12.2k RMC	Flat	Fixed	Rear	0	<b>0.605</b>	*2	
4132	826.4	12.2k RMC	Flat	Fixed	Right edge	0	<b>0.210</b>	*1	
4132	826.4	12.2k RMC	Flat	Fixed	Left edge		Not required		
4132	826.4	12.2k RMC	Flat	Fixed	Top edge	6	<b>0.0960</b>	*1	
4132	826.4	12.2k RMC	Flat	Fixed	Top edge	0	<b>0.197</b>	*2	
4132	826.4	12.2k RMC	Flat	Fixed	Bottom edge	0	Not required		
<b>Vertex position</b>									
4132	826.4	12.2k RMC	Flat	Fixed	Top vertex	Right 45 °	<b>0.024</b>	*1	
<b>Step.3 Channel change ( SAR level in Step.1 &gt; 0.8 w/kg )</b>									
4183	836.6	12.2k RMC	Flat	Fixed	Worst		Not required		
4233	846.6	12.2k RMC	Flat	Fixed	Worst		Not required		

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.

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**8.4 WCDMA Band II Body SAR****(1)Method of measurement****<Body>**

Step1. The searching for the worst position

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

Step2. The changing to the channels (Mid, High)

The test was performed at the position that SAR value is more than 0.8W/kg.

Note:

1)The BODY SAR is not required for HSPA mode because the maximum average output power for HSPA 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 [%]
9-Feb	24	34	MSL 1800	23.5	1880	$\epsilon_r$	53.3	50.8	-4.6	+/-5
						$\sigma$ [mho/m]	1.52	1.55	1.8	+/-5
10-Feb	24	36	MSL 1800	23.5	1852.4	$\epsilon_r$	53.3	50.9	-4.5	+/-5
						$\sigma$ [mho/m]	1.52	1.46	-4.2	+/-5
10-Feb	24	36	MSL 1800	23.5	1907.6	$\epsilon_r$	53.3	50.8	-4.8	+/-5
						$\sigma$ [mho/m]	1.52	1.57	3.1	+/-5

$\epsilon_r$ : Relative Permittivity /  $\sigma$ : Conductivity

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

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**(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	
<b>Step.1 Position searching</b>								
9400	1880	12.2k RMC	Flat	Fixed	Front		Not required	
9400	1880	12.2k RMC	Flat	Fixed	Rear	7	<b>1.04</b>	*1
9400	1880	12.2k RMC	Flat	Fixed	Rear	0	<b>0.523</b>	*2
9400	1880	12.2k RMC	Flat	Fixed	Right edge	0	<b>0.179</b>	*1
9400	1880	12.2k RMC	Flat	Fixed	Left edge		Not required	
9400	1880	12.2k RMC	Flat	Fixed	Top edge	6	<b>0.729</b>	*1
9400	1880	12.2k RMC	Flat	Fixed	Top edge	0	<b>0.377</b>	*2
9400	1880	12.2k RMC	Flat	Fixed	Bottom edge	0	Not required	
<b>Vertex position</b>								
9400	1880	12.2k RMC	Flat	Fixed	Top vertex	Right 45 °	<b>0.32</b>	*1
<b>Step.2 Channel change ( SAR level in Step.1 &gt; 0.8 w/kg )</b>								
9262	1852.4	12.2k RMC	Flat	Fixed	Worst	7	<b>1.02</b>	*1
9538	1907.6	12.2k RMC	Flat	Fixed	Worst	7	<b>1.15</b>	*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.

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## 8.5 WLAN Body

### (1) Method of measurement

Step1. The searching for the worst position

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

Note:

- 1)The BODY SAR is not required for 11g/n mode because the maximum average output power for 11g/n mode is less than 1/4dB higher than that measured 11b mode.
- 2)The other channel was not required since maximum average output power 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 [%]
16-Feb	23	32	MSL 2450	22.5	2437	$\epsilon_r$	52.7	50.8	-3.6	+/-5
						$\sigma$ [mho/m]	1.95	1.99	2.1	+/-5

$\epsilon_r$ : Relative Permittivity /  $\sigma$ : 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]
Channel	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak
<b>Step.1 Position searching</b>							
6	2437	11b 1Mbps	Flat	Fixed	Front	0	<b>Not required</b>
6	2437	11b 1Mbps	Flat	Fixed	Rear	7	<b>0.070</b>
6	2437	11b 1Mbps	Flat	Fixed	Rear	0	<b>0.509</b>
6	2437	11b 1Mbps	Flat	Fixed	Right edge	0	<b>Not required</b>
6	2437	11b 1Mbps	Flat	Fixed	Left edge	0	<b>0.043</b>
6	2437	11b 1Mbps	Flat	Fixed	Top edge	6	<b>Not required</b>
6	2437	11b 1Mbps	Flat	Fixed	Top edge	0	<b>0.243</b>
6	2437	11b 1Mbps	Flat	Fixed	Bottom edge	0	<b>Not required</b>

\*Rear 7mm for WLAN was tested for Simultaneous transmission evaluation because this position is worst mode in WWAN mode.

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## 8.6 Simultaneous transmission evaluation for Body

### Result of SUM $\Sigma$ SAR1g

SUM $\Sigma$ SAR1g (GSM850/PCS1900 +WLAN(2.4G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		GSM850 Band	PCS1900 Band	WLAN 2.4G	WWAN(GSM850)+ WLAN	WWAN(PCS1900) + WLAN
Front	-	Not required	Not required	Not required	-	-
Rear	7	0.443	0.790	0.070	0.513	0.860
Rear	0	0.833	0.388	0.509	1.342	0.897
Right edge	0	0.355	0.136	Not required	-	-
Left edge	0	Not required	Not required	0.043	-	-
Top edge	6	0.163	0.562	Not required	-	-
Top edge	0	0.351	0.265	0.243	0.594	0.508
Bottom edge	-	Not required	Not required	Not required	-	-
Vertex	45 degree	0.037	0.240	Not required	-	-

: Highest SUM  $\Sigma$  SAR1g Body simultaneous transmissions( in SUM  $\Sigma$  SAR1g <1.6W/kg)

SUM $\Sigma$ SAR1g (WCDMA Band V/II+WLAN(2.4G))						
Position	Separation [mm]	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
		Band V	Band II	WLAN 2.4G	WWAN(Band V)+ WLAN	WWAN(Band II) + WLAN
Front	-	Not required	Not required	Not required	-	-
Rear	7	0.313	1.150	0.070	0.383	1.220
Rear	0	0.605	0.523	0.509	1.114	1.032
Right edge	0	0.210	0.179	Not required	-	-
Left edge	0	Not required	Not required	0.043	-	-
Top edge	6	0.096	0.729	Not required	-	-
Top edge	0	0.197	0.377	0.243	0.440	0.620
Bottom edge	-	Not required	Not required	Not required	-	-
Vertex	45 degree	0.024	0.320	Not required	-	-

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**SECTION 9 Test instruments****[1/2]**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	Power Measurement	2011/12/09 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	Power Measurement	2011/08/09 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	Power Measurement	2011/08/09 * 12
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	Power Measurement	2011/11/26 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	Power Measurement	2011/10/28 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	Power Measurement	2011/03/14 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	Power Measurement	2011/06/23 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	Power Measurement	2011/09/13 * 12
MPM-11	Dual Power Meter	Agilent	E4419B	MY45102060	Power Measurement	2011/07/14 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	Power Measurement	2011/03/14 * 12
MCC-96	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30817/2	Power Measurement	2011/05/27 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	Power Measurement	2011/09/27 * 12
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2011/02/01 * 12
MPSE-03	Power sensor	Agilent	E9327A	US40440576	SAR	2011/02/02 * 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-07	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3825	SAR	2011/12/16 * 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	2011/12/20 * 36
MDA-06	Dipole Antenna	Schmid&Partner Engineering AG	D1800V2	2d040	SAR	2011/11/23 * 36
MDA-07	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	SAR	2010/09/13 * 36

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Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPF-02	2mmOval Flat Phantom ERI 4.0	Schmid&Partner Engineering AG	QD VA 001B (ERI4.0)	1045	SAR	2011/04/01 * 12
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
MSL900					Daily check	Target value $\pm$ 5%
MSL1800					Daily check	Target value $\pm$ 5%
MSL2450					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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