SAR TEST REPORT

Test Report No. : 32FE0253-HO-N-R1

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 : 0.831W/kg **FCC Part 24E** Body : 0.756W/kg

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6 This report is a revised version of 32FE0253-HO-N. 32FE0253-HO-N is replaced with this report.

Date of test: March 5 to 22, 2012

Representative test engineer:

Hisayoshi Sato
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Takahiro Hatakeda
Leader of WiSE Japan
UL Verification Service

NVLAP LAB CODE: 200572-0

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

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.	R31C10LL03Y, R31C10LL02Z, R31C10LKEZH, R31C10LKEOW
Rating	DC5.0V (USB Power Supply)
	Li-ion Battery (M/N; SP3676B1A(1S2P)) DC3.7V/7000mAh, 25.9Wh
Option Battery	N/A
Body-wornAccessory	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: -4.41dBi (MAX) 869-894MHz: -3.77dBi (MAX) PCS: 1850-1910MHz: 1.65dBi (MAX) 1930-1990MHz: -1.79dBi (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: 4M06F9W
Antenna Type	PIFA
Antenna Gain	Band V: 824-849MHz: -4.41dBi (MAX) 869-894MHz: -3.77dBi (MAX) Band II: 1850-1910MHz: 1.65dBi (MAX) 1930-1990MHz: -1.79dBi (MAX)

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.

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.

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

3.4 Test Location

*Shielded room for SAR testings
UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

SECTION 4 : Test result

4.1 Stand-alone SAR result

No.	Capable Tx configrations		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 *4	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 $60/f_{[GHz]}$[mW] and the antenna of Bluetooth is ≥ 5.0 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.
*4 WLAN SAR result in Test report No. 32FE0253-HO-Q-R3 was used.

Mode	1g Head SAR [W/kg]	1g BodySAR [W/kg]
GSM850	No	0.831
PCS1900	No	0.500
WCDMA band V	No	0.568
WCDMA band II	No	0.756
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 asWLAN (802.11b/g/n) & Bluetooth devices besides licensed transmitter WWAN, and the following simultaneous transmission is possible.

No.	Capable Tx configrations		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				

<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.	∑1g SAR (WWAN + WLAN) < 1.6W/kg Body:1.342W/kg
Step6.	No simultaneous transmission.

<WWAN + Bluetooth >
Simultaneous transmitter evaluation based on the KDB648474.

Step1.	WWAN antenna is >5cm from Bluetooth antenna
Step2.	Bluetooth power < 2Pref (=60/$f_{[GHz]}$)
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)	
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			

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	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
				[MHz]							
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

2) GSM850 (Power reduction mode)

GSM850 SAR Power (Power reduction)											
Mode		Crest Factor (typical)	Ch	Frequency	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
				[MHz]							
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

3) PCS1900 (Normal mode)

PCS1900 SAR Power (Normal)											
Mode		Crest Factor (typical)	Ch	Frequency	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
				[MHz]							
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

4) PCS1900 (Power reduction mode)

PCS1900 SAR Power (Power reduction)											
Mode		Crest Factor (typical)	Ch	Frequency	Time-based AVG				Average frame power		
					P/M Reading [dBm]	Atten.	Cable Loss	Result [dBm]	Agilent Reading [dBm]	Cable Loss	Result [dBm]
				[MHz]	Time-AVG	[dB]	[dB]	Time-AVG	slotted AVG	[dB]	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

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 section5.2 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)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

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		βc/βd	MPR	Power Class 3 limit
						βc	βd			
	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						
	ΔACK	ΔNACK	ΔCQI	Ack-Nack repetition factor	CQI Feedback	CQI Repetition Factor	Ahs=βhs/βc
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

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

WCDMA V band								
Normal						Power reduction		
Mode	Ch	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	4132	826.4	20.48	1.50	21.98	14.95	1.50	16.45
Subtest1	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	4132	826.4	20.23	1.50	21.73	14.96	1.50	16.46
Subtest2	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	4132	826.4	19.98	1.50	21.48	14.96	1.50	16.46
Subtest3	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	4132	826.4	19.73	1.50	21.23	14.94	1.50	16.44
Subtest4	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	4132	826.4	20.09	1.50	21.59	13.97	1.50	15.47
Subtest1	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	4132	826.4	18.36	1.50	19.86	13.46	1.50	14.96
Subtest2	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	4132	826.4	19.32	1.50	20.82	14.26	1.50	15.76
Subtest3	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	4132	826.4	18.50	1.50	20.00	13.68	1.50	15.18
Subtest4	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	4132	826.4	20.05	1.50	21.55	13.93	1.50	15.43
Subtest5	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.

6) WCDMA II (Normal mode/ Power reduction 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	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.

5.3 Detail for Power Reduction and sensor recognition distance

Mode	Average power reduction results	Tolerance
	[dB]	[dB]
GSM850 GSM/GPRS	4.81	4.8 +/-2
GSM850 EGPRS	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)	*3
WCDMA V	1	12.2k RMC	826.4MHz (4132ch)	*2 *3
WCDMA II	1	12.2k RMC	1852.4MHz(9262ch) 1880.0MHz(9400ch) 1907.6MHz(9538ch)	*2 *3
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				

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

5.5 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/η=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.

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 8mm from the rear case and 8mm from top edge of EUT.

Sensor specification			
Position	**Yes/No**	**Type**	**Distance detected**
Front	No	-	-
Rear	Yes	grip	8mm
Left edge	No	-	-
Right edge	No	-	-
Top edge	Yes	grip	8mm
Bottom edge	No	-	-

6.2 Description of the Body setup

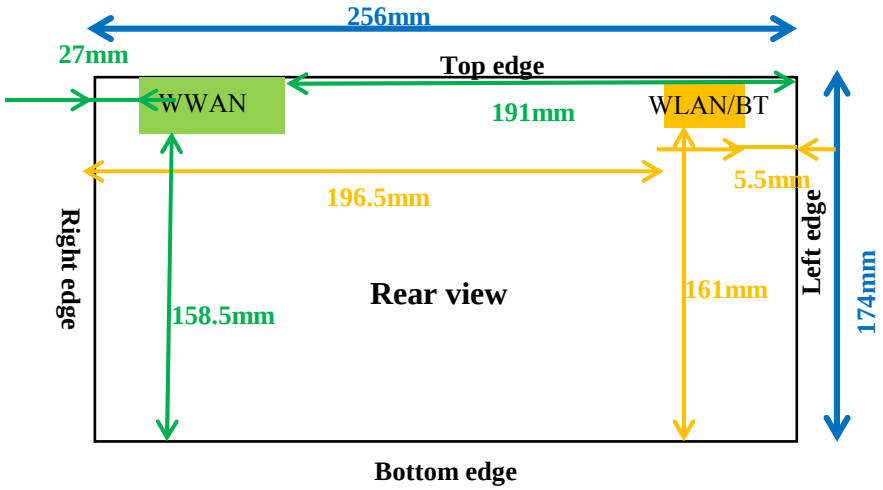
i)Procedure for SAR testing

-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

GSM850	**Data transmission mode (GPRS)**
PCS1900	**Data transmission mode (GPRS,EGPRS)**
WCDMA V/II	**Data transmission mode (12.2kRMC)**

iii)Test position



WWAN to WLAN : 156.72mm

<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		
			Reduction on☑/off☐	Tested	Antenna
1	Front	0mm	☐	☐	Fixed
2	Rear	0mm	☑	☑	Fixed
3	Rear	8mm	☐	☑	Fixed
4	Left edge	0mm	☐	☐	Fixed
5	Right edge	0mm	☐	☑	Fixed
6	Top edge	0mm	☑	☑	Fixed
7	Top edge	8mm	☐	☑	Fixed
8	Bottom edge	0mm	☐	☐	Fixed
9	Vertex Top	45deg.	☐	☑	Fixed

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	Uncertai value ±	Probability distribution	divisor	(ci) 1g	Standard (1g)	vi or veff
Measurement System						
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	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	27
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	5
Power drift	± 5.0	Rectangular	√3	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.64	± 1.8	∞
Liquid conductivity (meas.)	+ 3.4	Rectangular	1	0.64	+ 2.2	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (meas.)	- 4.5	Rectangular	1	0.6	- 2.7	∞
Combined Standard Uncertainty					± **11.316**	
Expanded Uncertainty (k=2)					± **22.6**	

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 [%]
9-Mar	24	41	MSL 900	23.5	848.8	εr	55.2	53.0	-3.9	+/-5
						σ [mho/m]	0.97	0.97	0.4	+/-5
22-Mar	24	45	MSL 900	23.5	848.8	εr	55.2	52.6	-4.7	+/-5
						σ [mho/m]	0.97	0.95	-1.9	+/-5
22-Mar	24	45	MSL 900	23.5	824.2	εr	55.2	52.8	-4.3	+/-5
						σ [mho/m]	0.97	0.93	-4.0	+/-5
22-Mar	24	45	MSL 900	23.5	836.6	εr	55.2	52.7	-4.5	+/-5
						σ [mho/m]	0.97	0.94	-3.6	+/-5

εr: Relative Permittivity / σ : Coductivity

*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	Note
Step.1 Position searching								
251	848.8	GPRS 4slots	Flat	Fixed	Front		Not required	
251	848.8	GPRS 4slots	Flat	Fixed	Rear	8	**0.612**	*1
251	848.8	GPRS 4slots	Flat	Fixed	Rear	0	**0.831**	*2
251	848.8	GPRS 4slots	Flat	Fixed	Right edge	0	**0.245**	*1
251	848.8	GPRS 4slots	Flat	Fixed	Left edge		Not required	
251	848.8	GPRS 4slots	Flat	Fixed	Top edge	8	**0.381**	*1
251	848.8	GPRS 4slots	Flat	Fixed	Top edge	0	**0.232**	*2
251	848.8	GPRS 4slots	Flat	Fixed	Bottom edge		Not required	
Vertex position								
251	848.8	GPRS 4slots	Flat	Fixed	Top vertex	Right 45 °	**0.065**	*1
Step.3 Channel change (SAR level in Step.1 > 0.8 w/kg)								
128	824.2	GPRS 4slots	Flat	Fixed	Worst	0	**0.754**	*2
190	836.6	GPRS 4slots	Flat	Fixed	Worst	0	**0.770**	*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.

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.

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 [%]
6-Mar	24	39	MSL 1800	24.0	1880	εr	53.3	51.4	-3.7	+/-5
						σ [mho/m]	1.52	1.56	2.6	+/-5
8-Mar	24	44	MSL 1800	24.0	1880	εr	53.3	50.9	-4.5	+/-5
						σ [mho/m]	1.52	1.54	1.1	+/-5

εr: Relative Permittivity / σ : Coductivity

*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]	
Channe	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	Note
Step.1 Position searching								
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Front		Not required	
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Rear	8	**0.467**	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Rear	0	**0.443**	*2
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Right edge	0	**0.045**	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Left edge		Not required	
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top edge	8	**0.446**	*1
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top edge	0	**0.304**	*2
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Bottom edge		Not required	
Vertex position								
661	1880.0	EGPRS 3slots (8PSK)	Flat	Fixed	Top vertex	Right 45 °	**0.076**	*1
Step.2 Mode change								
661	1880.0	GPRS 3slots	Flat	Fixed	Worst	8	**0.496**	*1
661	1880.0	EGPRS 3slots (GMSK)	Flat	Fixed	Worst	8	**0.500**	*1
Step.3 Channel change (SAR level in Step.1 > 0.8 w/kg)								
512	1850.2	EGPRS 3slots (8PSK)	Flat	Fixed	Worst		**Not required**	*1
810	1909.8	EGPRS 3slots (8PSK)	Flat	Fixed	Worst		**Not required**	*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.

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 [%]
7-Mar	24	33	MSL 900	23.5	826.4	εr	55.2	54.3	-1.6	+/-5
						σ [mho/m]	0.97	0.95	-2.5	+/-5
9-Mar	24	41	MSL 900	23.5	826.4	εr	55.2	53.2	-3.7	+/-5
						σ [mho/m]	0.97	0.95	-2.1	+/-5

εr: Relative Permittivity / σ : Coductivity

*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]	
Channe	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	Note
Step.1 Position searching								
4132	826.4	12.2k RMC	Flat	Fixed	Front		Not required	
4132	826.4	12.2k RMC	Flat	Fixed	Rear	8	**0.474**	*1
4132	826.4	12.2k RMC	Flat	Fixed	Rear	0	**0.568**	*2
4132	826.4	12.2k RMC	Flat	Fixed	Right edge	0	**0.195**	*1
4132	826.4	12.2k RMC	Flat	Fixed	Left edge		Not required	
4132	826.4	12.2k RMC	Flat	Fixed	Top edge	8	**0.348**	*1
4132	826.4	12.2k RMC	Flat	Fixed	Top edge	0	**0.139**	*2
4132	826.4	12.2k RMC	Flat	Fixed	Bottom edge		Not required	
Vertex position								
4132	826.4	12.2k RMC	Flat	Fixed	Top vertex	Right 45 °	**0.048**	*1
Step.3 Channel change (SAR level in Step.1 > 0.8 w/kg)								
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.

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.

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 [%]
5-Mar	24	35	MSL 1800	23.5	1880	εr	53.3	51.0	-4.3	+/-5
						σ [mho/m]	1.52	1.57	3.4	+/-5
8-Mar	24	42	MSL 1800	23.5	1880	εr	53.3	50.9	-4.5	+/-5
						σ [mho/m]	1.52	1.54	1.1	+/-5

εr: Relative Permittivity / σ : Coductivity

*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
Channe	[MHz]			Antenna	Position	Separation [mm]	Maximum value of multi-peak	
Step.1 Position searching								
9400	1880	12.2k RMC	Flat	Fixed	Front		Not required	
9400	1880	12.2k RMC	Flat	Fixed	Rear	8	**0.756**	*1
9400	1880	12.2k RMC	Flat	Fixed	Rear	0	**0.661**	*2
9400	1880	12.2k RMC	Flat	Fixed	Right edge	0	**0.072**	*1
9400	1880	12.2k RMC	Flat	Fixed	Left edge		Not required	
9400	1880	12.2k RMC	Flat	Fixed	Top edge	8	**0.679**	*1
9400	1880	12.2k RMC	Flat	Fixed	Top edge	0	**0.452**	*2
9400	1880	12.2k RMC	Flat	Fixed	Bottom edge		Not required	
Vertex position								
9400	1880	12.2k RMC	Flat	Fixed	Top vertex	Right 45 º	**0.156**	*1
Step.2 Channel change (SAR level in Step.1 > 0.8 w/kg)								
9262	1852.4	12.2k RMC	Flat	Fixed	Worst		**Not required**	*1
9538	1907.6	12.2k RMC	Flat	Fixed	Worst		**Not required**	*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.

8.5 Simultaneous transmission evaluation for Body

Result of SUM ΣSAR1g

SUM ΣSAR1g (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	8	0.612	0.500	0.070	0.682	0.570
Rear	0	0.831	0.443	0.509	1.340	0.952
Right edge	0	0.245	0.045	Not required	-	-
Left edge	0	Not required	Not required	0.043	-	-
Top edge	8	0.381	0.446	Not required	-	-
Top edge	0	0.232	0.304	0.243	0.475	0.547
Bottom edge	-	Not required	Not required	Not required	-	-
Vertex	45 degree	0.065	0.076	Not required	-	-

: Highest SUM ΣSAR1g Body simultaneous transmissions(in SUM ΣSAR1g <1.6W/kg)

SUM ΣSAR1g (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	8	0.474	0.756	0.070	0.544	0.826
Rear	0	0.568	0.661	0.509	1.077	1.170
Right edge	0	0.195	0.072	Not required	-	-
Left edge	0	Not required	Not required	0.043	-	-
Top edge	8	0.348	0.679	Not required	-	-
Top edge	0	0.139	0.452	0.243	0.382	0.695
Bottom edge	-	Not required	Not required	Not required	-	-
Vertex	45 degree	0.048	0.156	Not required	-	-

*WLAN SAR result in Test Report No. 32FE0253-HO-Q-R3 was used.
Regarding the test with longer separation, SAR value of Rear 7mm and Top 6mm was used as it was higher than that of 8mm separation.

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-06	Power Meter	Agilent	E4419B	MY45100796	SAR	2011/09/14*12
MPSE-16	Power sensor	Agilent	E9301A	MY41498313	SAR	2011/07/14 * 12
MPSE-15	Power sensor	Agilent	E9301A	MY41498311	SAR	2011/07/14 * 12
MAT-17	Attenuator(20dB)_DC-1GHz_N	Weinschel Corp	MODEL 1	BG0143	SAR	2012/01/10
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
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

[2/2]

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	Digtal 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 ± 5%
MSL1800					Daily check	Target value ± 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.