

FCC SAR TEST REPORT

Test File No : F690501/RF-SAR002526-A1

Equipment Under Test	LED View Cover
Model Name	EF-NG960
Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Address of Applicant	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677 Republic of Korea
FCC ID	A3L-EFNG960
Cell Phone FCC ID	A3LSMG960U
Exposure Category	General Population/Uncontrolled Exposure
Standards	FCC 47 CFR Part 2 (2.1093) IEEE 1528, 2013 ANSI/IEEE C95.1, C95.3
Date of Test(s)	2018-03-28 ~2018-04-03
Date of Issue	2018-04-05

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Korea Co., Ltd. or testing done by SGS Korea Co., Ltd. in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. in writing.



Report prepared by /
Jongho Park
Test Engineer



Approved by /
Minhyuk Han
Technical Manager

**SGS Korea Co., Ltd.**

4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807

Tel. 031-428-5700 / Fax. 031-427-2371

<http://www.sgsgroup.kr>

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Revision history

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-	January 16, 2018	Initial issue	-
A1	April 05, 2018	Report Updated - - Additional All highest SAR test	Jongho Park

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SGS Korea Co., Ltd.

4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807

Tel. 031-428-5700 / Fax. 031-427-2371

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1 Testing Laboratory

Company Name	SGS Korea Co., Ltd. (Gunpo Laboratory)
Address	Wireless Div. 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807 Republic of Korea
Telephone	+82 +31 428 5700
FAX	+82 +31 427 2371

2 Details of Manufacturer

Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Address	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677 Republic of Korea
Email	j-man.kim@samsung.com
Phone No.	+82-10-4933-6633

3 Description of EUT(s)

EUT Type	LED View Cover
Model Name	EF-NG960
Serial Number	R37JA6QNR7XHB3
Mode of Operation	NFC
Tx Frequency Range	NFC (13.56 MHz)

4 Information of Attached Cell Phone

EUT Type	Portable Handset
Model Name	SM-G960U
Additional Model	SM-G960U1, SM-G960W, SM-G960XU
Serial Number	R38JA0KFAKE
Mode of Operation	CDMA/EVDO BC10(\$90S) / CDMA/EVDO BC00(\$22H) /PCS CDMA/EVDO /GSM/GPRS/EDGE850 /GSM/GPRS/EDGE1900 /UMTS 850 /UMTS 1750 /UMTS 1900 /LTE Band 71 /LTE Band 12 /LTE Band 17 /LTE Band 13 /LTE Band 14 /LTE Band 26 /LTE Band 5 /LTE Band 66 /LTE Band 4 /LTE Band 25 /LTE Band 2 /LTE Band 30 /LTE Band 7 /LTE Band 41 /LTE Band 38 /2.4 GHz WLAN /U-NII-1 /U-NII-2A /U-NII-2C /U-NII-3 /Bluetooth / ANT+ /NFC

Tx Frequency Range	CDMA/EVDO BC10(\$90S) : 817.9 ~ 823.1 MHz CDMA/EVDO BC00(\$22H) : 824.70 ~ 848.31 MHz PCS CDMA/EVDO : 1851.25 ~ 1908.75 MHz GSM/GPRS/EDGE850 : 824.2 ~ 848.8 MHz GSM/GPRS/EDGE1900 : 1850.2 ~ 1909.8 MHz UMTS 850 : 826.4 ~ 846.6 MHz UMTS 1750 : 1712.4 ~ 1752.6 MHz UMTS 1900 : 1852.4 ~ 1907.6 MHz LTE Band 71 : 666.5 ~ 695.5 MHz LTE Band 12 : 699.7 ~ 715.3 MHz LTE Band 17 : 706.5 ~ 713.5 MHz LTE Band 13 : 779.5 ~ 784.5 MHz LTE Band 14 : 790.5 ~ 795.5 MHz LTE Band 26 (Cell) : 814.7 ~ 848.3 MHz LTE Band 5 (Cell) : 824.7 ~ 848.3 MHz LTE Band 66 (AWS) : 1710.7 ~ 1779.3 MHz LTE Band 4 (AWS) : 1710.7 ~ 1754.3 MHz LTE Band 25 (PCS) : 1850.7 ~ 1914.3 MHz LTE Band 2 (PCS) : 1850.7 ~ 1909.3 MHz LTE Band 30 : 2307.5 ~ 2312.5 MHz LTE Band 7 : 2502.5 ~ 2567.5 MHz LTE Band 41 : 2498.5 ~ 2687.5 MHz LTE Band 38 : 2672.5 ~ 2617.5 MHz 2.4 GHz WLAN : 2412 ~ 2462 MHz / U-NII-1 : 5180 ~ 5240 MHz U-NII-2A : 5260 ~ 5320 MHz / U-NII-2C : 5500 ~ 5720 MHz U-NII-3 : 5745 ~ 5825 MHz / Bluetooth , ANT+ : 2402 ~ 2408 MHz NFC : 13.56 MHz
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5 The Highest Reported SAR Values

Equipment Class	Band	Highest Reported SAR					
		Head 1g (W/kg)		Body Worn 1g (W/kg)		Hotspot 1g (W/kg)	
		Original	+ LED Cover	Original	+ LED Cover	Original	+ LED Cover
PCE	CDMA/EVDO BC10(\$90S)	0.26	0.20	0.31	0.29	0.50	0.45
PCE	CDMA/EVDO BC00(\$22H)	0.33	0.20	0.40	0.27	0.68	0.48
PCE	PCS CDMA/EVDO	0.33	0.29	0.96	0.63	0.78	0.54
PCE	GSM/GPRS/EDGE850	0.22	0.14	0.21	0.18	0.41	0.27
PCE	GSM/GPRS/EDGE1900	0.11	0.08	0.37	0.36	0.41	0.43
PCE	UMTS 850	0.34	0.21	0.42	0.31	0.63	0.42
PCE	UMTS 1750	0.28	0.26	0.62	0.55	0.86	0.69
PCE	UMTS 1900	0.20	0.12	0.78	0.45	0.89	0.74
PCE	LTE Band 71	0.12	0.12	0.27	0.20	0.38	0.28
PCE	LTE Band 12	0.13	0.12	0.29	0.18	0.40	0.28
PCE	LTE Band 17	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 13	0.23	0.18	0.38	0.30	0.59	0.40
PCE	LTE Band 14	0.26	0.17	0.40	0.31	0.59	0.41
PCE	LTE Band 26 (Cell)	0.33	0.27	0.35	0.28	0.55	0.44
PCE	LTE Band 5 (Cell)	0.35	0.29	0.37	0.31	0.66	0.47
PCE	LTE Band 66 (AWS)	0.29	0.25	0.78	0.65	0.77	0.69
PCE	LTE Band 4 (AWS)	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	0.24	0.21	0.88	0.56	0.75	0.68
PCE	LTE Band 2 (PCS)	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 30	0.12	0.09	0.29	0.28	0.52	0.41
PCE	LTE Band 7	0.12	0.10	0.50	0.27	0.77	0.56
PCE	LTE Band 41	0.13	0.08	0.52	0.30	0.95	0.59
PCE	LTE Band 38	N/A	N/A	N/A	N/A	N/A	N/A
DTS	2.4 GHz WLAN	0.59	0.37	0.11	0.09	0.37	0.23
NII	U-NII-1	N/A	N/A	N/A	N/A	N/A	N/A
NII	U-NII-2A	0.40	0.26	0.27	0.27	N/A	N/A
NII	U-NII-2C	0.30	0.24	0.73	0.58	N/A	N/A
NII	U-NII-3	0.30	0.25	0.59	0.29	1.08	0.86
DSS/DTS	Bluetooth	0.63	0.45	<0.1	0.06	0.17	0.10
Simultaneous SAR per KDB 690783 D01v01r03		1.25	0.89	1.59	1.23	1.59	1.47

6 Test Methodology

ANSI C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

Test tests documented in this report were performed in accordance with IEEE Standard 1528-2013 and the following published KDB procedures.

In additions;

☒	KDB 865664 D01v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
☒	KDB 447498 D01v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
☐	KDB 447498 D02v02r01	SAR Measurement Procedures for USB Dongle Transmitters
☒	KDB 248227 D01v02r02	SAR Guidance For IEEE 802.11 (Wi-Fi) Transmitters
☐	KDB 615223 D01v01r01	802.16e/WiMax SAR Measurement Guidance
☐	KDB 616217 D04v01r02	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☐	KDB 643646 D01v01r03	SAR Test Reduction Considerations for Occupational PTT Radios
☒	KDB 648474 D03v01r04	Evaluation and Approval Considerations for Handsets with Specific Wireless Charging Battery Covers
☒	KDB 648474 D04v01r03	SAR Evaluation Considerations for Wireless Handsets
☐	KDB 680106 D01v02	RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications
☒	KDB 941225 D01v03r01	3G SAR Measurement Procedures
☒	KDB 941225 D05v02r04	SAR Evaluation Considerations for LTE Devices
☒	KDB 941225 D06v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
☐	KDB 941225 D07v01r02	SAR Evaluation Procedures for UMPC Mini-Tablet Devices

7 Testing Environment

Ambient temperature	: 18°C ~ 25°C
Relative humidity	: 30% ~ 70%
Liquid temperature of during the test	: $\pm 2^{\circ}\text{C}$
Ambient noise & Reflection	: $< 0.012 \text{ W/kg}$

8 Specific Absorption Rate (SAR)

8.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled

8.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\text{SAR} = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$\text{SAR} = C \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$\text{SAR} = \frac{\sigma |E|^2}{\rho}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

8.3 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.3-2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting

source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Partial Peak SAR (Partial)	1.60 m W/g	8.00 m W/g
Partial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

1. The spatial Peak value of the SAR averaged over any 1g gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

9 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. 1. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E_i|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli TX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

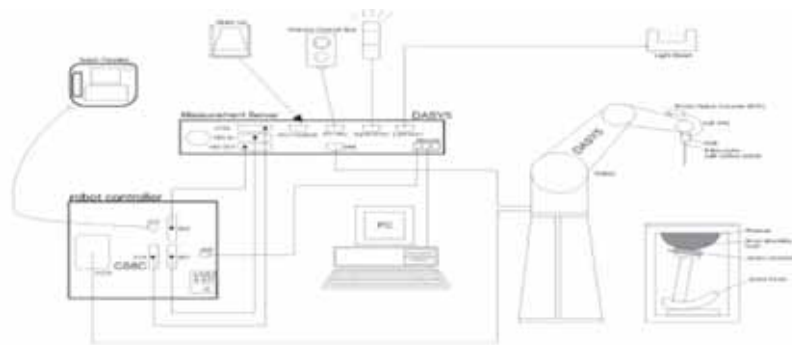


Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Verification dipole kits allowing to validate the proper functioning of the system.

10 System Components

10.1 Probe

- Construction** : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
- Calibration** : Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 835 and HSL1900.
Additional CF-Calibration for other liquids and frequencies upon request.
- Frequency** : 10 MHz to 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
- Directivity** : ± 0.3 dB in HSL (rotation around probe axis)
 ± 0.5 dB in tissue material (rotation normal to probe axis)
- Dynamic Range** : $10\mu\text{W/g}$ to > 100 mW/g;
Linearity: ± 0.2 dB (noise: typically $< 1\mu\text{W/g}$)
- Dimensions** : Overall length: 337 mm (Tip length: 20 mm)
Tip diameter: 2.5 mm (Body diameter: 12 mm)
Distance from probe tip to dipole centers: 1 mm
- Application** : High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%



EX3DV4 E-Field Probe

NOTE:

- The Probe parameters have been calibrated by the SPEAG. Please reference "APPENDIX C" for the Calibration Certification Report.

10.2 SAM Phantom

- Construction** : The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure



SAM Phantom

- Shell Thickness** : $2.0\text{ mm} \pm 0.1\text{ mm}$
- Filling Volume** : Approx. 25 liters

10.3 Device Holder

Construction: : In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



Device Holder

11 SAR Measurement Procedures

11.1 Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2 and 3: Area Scan & Zoom Scan Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

< Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04 >

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			$30^{\circ} \pm 1^{\circ}$	$20^{\circ} \pm 1^{\circ}$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

12 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. 1. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. These tests were done at 750 / 835 / 1750 / 1900 / 2300 / 2450 / 2600 / 5300 / 5600 / 5800 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 18 ~ 25° C, the relative humidity was in the range 30 ~ 70 % R.H and the liquid depth above the ear reference points was $\geq 15 \text{ cm} \pm 5 \text{ mm}$ (frequency $\leq 3 \text{ GHz}$) or $\geq 10 \text{ cm} \pm 5 \text{ mm}$ (frequency $> 3 \text{ GHz}$) in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

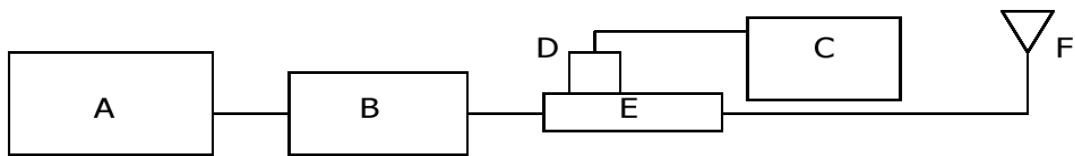


Fig 1. The microwave circuit arrangement used for SAR system verification

- A. Agilent Model E8247C Signal Generator
- B. MECA Model AMP2027 Power Amplifier
- EMPOWER Model 2002-BBS2C4AEL Power Amplifier
- C. Agilent Model E4419B / E4416A Power Meter
- D. Agilent Model E9300H / E9327A Power Sensor
- E. Agilent Model 772D / 778D Dual Directional Coupler
- F. Reference dipole Antenna



Photo of the dipole Antenna

Head SAR System Verification

Verification Kit	Probe S/N	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (0.1 W)	Normalized SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D750V3 SN:1085	3791	750	8.29	0.858	8.58	3.50	2018-03-31	21.0
D750V3 SN:1085	3791	750	8.29	0.882	8.82	6.39	2018-03-31	21.0
D835V2 SN:4d138	3791	835	9.61	0.964	9.64	0.31	2018-04-02	21.8
D1750V2 SN:1116	3862	1750	36.60	3.61	36.10	-1.37	2018-04-01	22.0
D1900V2 SN:5d033	3862	1900	37.90	3.65	46.5	-3.69	2018-04-01	22.0
D2300V2 SN:1028	3791	2300	48.80	4.62	46.20	-5.33	2018-03-28	22.1
D2450V2 SN:892	3791	2450	51.80	4.90	49.00	-5.41	2018-03-28	22.0
D2600V2 SN:1038	3791	2600	57.10	5.70	57.00	-0.18	2018-03-28	22.1
D5GHzV2 SN:1106	3862	5300	84.20	7.85	78.50	-6.77	2018-04-03	21.8
D5GHzV2 SN:1106	3862	5600	86.20	8.11	81.10	-5.92	2018-04-03	21.8
D5GHzV2 SN:1106	3862	5800	82.80	8.00	80.00	-3.38	2018-04-03	21.8

Table1. Results system verification

- **Body SAR System Verification**

Verification Kit	Probe S/N	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (0.1 W)	Normalized SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D750V3 SN:1085	3791	750	8.68	0.847	8.47	-2.42	2018-03-31	21.9
D750V3 SN:1085	3791	750	8.68	0.877	8.77	1.04	2018-03-31	21.9
D835V2 SN:4d138	3862	835	9.50	0.986	9.86	3.79	2018-03-29	21.7
D1750V2 SN:1116	3862	1750	36.80	3.81	38.10	3.53	2018-03-29	21.7
D1900V2 SN:5d033	3862	1900	40.70	3.90	39.00	-4.18	2018-04-01	21.9
D2300V2 SN:1028	3933	2300	46.90	4.49	44.90	-4.26	2018-03-30	21.7
D2450V2 SN:892	3862	2450	50.60	4.72	47.20	-6.72	2018-03-30	21.7
D2450V2 SN:892	3862	2450	50.60	5.26	52.60	3.95	2018-04-02	21.4
D2600V2 SN:1038	3862	2600	54.40	5.06	50.60	-6.99	2018-03-30	21.8
D5GHzV2 SN:1106	3862	5300	79.60	7.42	74.20	-6.78	2018-03-28	22.2
D5GHzV2 SN:1106	3862	5300	79.60	7.50	75.00	-5.78	2018-04-02	21.6
D5GHzV2 SN:1106	3862	5600	81.60	7.80	78.00	-4.41	2018-03-28	22.3
D5GHzV2 SN:1106	3862	5600	81.60	7.67	76.7	-6.00	2018-04-02	21.6
D5GHzV2 SN:1106	3862	5800	79.10	7.36	73.60	-6.95	2018-03-28	22.3
D5GHzV2 SN:1106	3862	5800	79.10	7.61	76.10	-3.79	2018-04-02	21.5

Table2. Results system verification

13 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Speag Model DAK-3.5 Dielectric Probe in conjunction with Agilent E5071C Network Analyzer(300 kHz - 6 GHz) by using a procedure detailed in Section V.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
750.0	Head	Measured, 2018-03-31	40.96	0.93	21.0
		Target Tissue	41.90	0.89	
		Deviation (%)	-2.24	4.49	
665.5		Measured, 2018-03-31	41.75	0.86	
		Deviation (%)	-0.36	-3.37	
715.3		Measured, 2018-03-31	41.17	0.90	
		Deviation (%)	-1.74	1.12	
750.0	Head	Measured, 2018-03-31	42.37	0.85	21.0
		Target Tissue	41.90	0.89	
		Deviation (%)	1.12	-4.49	
779.5		Measured, 2018-03-31	41.92	0.88	
		Deviation (%)	0.05	-1.12	
795.5		Measured, 2018-03-31	41.69	0.90	
		Deviation (%)	-0.50	1.12	
750.0	Body	Measured, 2018-03-31	55.82	0.96	21.9
		Target Tissue	55.50	0.96	
		Deviation (%)	0.58	0.00	
779.5		Measured, 2018-03-31	55.57	0.99	
		Deviation (%)	0.13	3.13	
793.0		Measured, 2018-03-31	55.42	1.00	
		Deviation (%)	-0.14	4.17	
750.0	Body	Measured, 2018-03-31	55.73	0.99	21.9
		Target Tissue	55.50	0.96	
		Deviation (%)	0.41	3.13	
665.5		Measured, 2018-03-31	56.41	0.92	
		Deviation (%)	1.64	-4.17	
715.3		Measured, 2018-03-31	55.93	0.96	
		Deviation (%)	0.77	0.00	
835.0	Body	Measured, 2018-03-29	55.46	0.96	21.7
		Target Tissue	55.20	0.97	
		Deviation (%)	0.47	-1.03	
814.7		Measured, 2018-03-29	55.64	0.94	
		Deviation (%)	0.80	-3.09	
848.8		Measured, 2018-03-29	55.35	0.97	
		Deviation (%)	0.27	0.00	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
835.0	Head	Measured, 2018-04-02	40.47	0.89	21.8
		Target Tissue	41.50	0.90	
		Deviation (%)	-2.48	-1.11	
820.1		Measured, 2018-04-02	40.50	0.88	
		Deviation (%)	-2.41	-2.22	
848.8		Measured, 2018-04-02	40.45	0.91	
		Deviation (%)	-2.53	1.11	
1750.0	Body	Measured, 2018-03-29	51.20	1.51	21.7
		Target Tissue	53.40	1.49	
		Deviation (%)	-4.12	1.34	
1710.7		Measured, 2018-03-29	51.38	1.47	
		Deviation (%)	-3.78	-1.34	
1770.0		Measured, 2018-03-29	51.14	1.53	
		Deviation (%)	-4.23	2.68	
1750.0	Head	Measured, 2018-04-01	38.40	1.41	22.0
		Target Tissue	40.10	1.37	
		Deviation (%)	-4.24	2.92	
1710.7		Measured, 2018-04-01	38.56	1.37	
		Deviation (%)	-3.84	0.00	
1779.3		Measured, 2018-04-01	38.31	1.43	
		Deviation (%)	-4.46	4.38	
1900.0	Head	Measured, 2018-04-01	38.09	1.38	22.0
		Target Tissue	40.00	1.40	
		Deviation (%)	-4.77	-1.43	
1850.2		Measured, 2018-04-01	38.23	1.34	
		Deviation (%)	-4.43	-4.29	
1914.3		Measured, 2018-04-01	38.07	1.40	
		Deviation (%)	-4.48	0.00	
1900.0	Body	Measured, 2018-04-01	54.93	1.51	21.9
		Target Tissue	53.30	1.52	
		Deviation (%)	3.06	-0.66	
1850.2		Measured, 2018-04-01	55.12	1.46	
		Deviation (%)	3.41	-3.95	
1914.3		Measured, 2018-04-01	54.89	1.53	
		Deviation (%)	2.98	0.66	
2300.0	Head	Measured, 2018-03-28	39.67	1.68	22.1
		Target Tissue	39.50	1.67	
		Deviation (%)	0.43	0.60	
2307.5		Measured, 2018-03-28	39.65	1.69	
		Deviation (%)	0.38	1.20	
2312.5		Measured, 2018-03-28	39.63	1.69	
		Deviation (%)	0.33	1.20	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
2300.0	Body	Measured, 2018-03-30	51.94	1.80	21.7
		Target Tissue	52.90	1.81	
		Deviation (%)	-1.81	-0.55	
2307.5		Measured, 2018-03-30	51.91	1.81	
		Deviation (%)	-1.87	0.00	
		2312.5	Measured, 2018-03-30	51.89	
Deviation (%)			-1.91	0.55	
2450.0	Head		Measured, 2018-03-28	38.64	1.86
		Target Tissue	39.20	1.80	
		Deviation (%)	-1.43	3.33	
2402.0		Measured, 2018-03-28	38.79	1.81	
		Deviation (%)	-1.05	0.56	
		2480.0	Measured, 2018-03-28	38.54	1.89
Deviation (%)			-1.68	5.00	
2450.0	Body		Measured, 2018-03-30	50.84	1.94
		Target Tissue	52.70	1.95	
		Deviation (%)	-3.53	-0.51	
2402.0		Measured, 2018-03-30	50.93	1.88	
		Deviation (%)	-3.36	-3.59	
		2480.0	Measured, 2018-03-30	50.73	1.97
Deviation (%)			-3.74	1.03	
2450.0	Body		Measured, 2018-04-02	50.46	1.99
		Target Tissue	52.70	1.95	
		Deviation (%)	-4.25	2.05	
2412.0		Measured, 2018-04-02	50.61	1.95	
		Deviation (%)	-3.97	0.00	
		2462.0	Measured, 2018-04-02	50.41	2.01
Deviation (%)			-4.35	3.08	
2600.0	Head		Measured, 2018-03-28	38.15	2.01
		Target Tissue	39.00	1.96	
		Deviation (%)	-2.18	2.55	
2502.5		Measured, 2018-03-28	38.47	1.90	
		Deviation (%)	-1.36	-3.06	
		2567.5	Measured, 2018-03-28	38.27	1.97
Deviation (%)			-1.87	0.51	
2600.0	Body		Measured, 2018-03-30	51.74	2.22
		Target Tissue	52.50	2.16	
		Deviation (%)	-1.45	2.78	
2502.5		Measured, 2018-03-30	52.02	2.10	
		Deviation (%)	-0.91	-2.78	
		2567.5	Measured, 2018-03-30	51.84	2.18
Deviation (%)			-1.26	0.93	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
5300.0	Body	Measured, 2018-03-28	47.92	5.46	22.2
		Target Tissue	48.90	5.42	
		Deviation (%)	-2.00	0.74	
5260.0		Measured, 2018-03-28	48.08	5.33	
Deviation (%)		-1.68	-1.66		
5320.0		Measured, 2018-03-28	47.91	5.51	
		Deviation (%)	-2.02	1.66	
5300.0	Body	Measured, 2018-04-02	47.15	5.34	21.6
		Target Tissue	48.90	5.42	
		Deviation (%)	-3.58	-1.48	
5260.0		Measured, 2018-04-02	46.95	5.20	
Deviation (%)		-3.99	-4.06		
5320.0		Measured, 2018-04-02	47.22	5.37	
		Deviation (%)	-3.44	-0.92	
5300.0	Head	Measured, 2018-04-03	35.20	4.75	21.8
		Target Tissue	35.90	4.76	
		Deviation (%)	-1.95	-0.21	
5260.0		Measured, 2018-04-03	35.26	4.65	
Deviation (%)		-1.78	-2.31		
5320.0		Measured, 2018-04-03	35.22	4.77	
		Deviation (%)	-1.89	0.21	
5600.0	Body	Measured, 2018-03-28	47.15	5.68	22.3
		Target Tissue	48.50	5.77	
		Deviation (%)	-2.78	-1.56	
5690.0		Measured, 2018-03-28	46.89	5.81	
Deviation (%)		-3.32	0.69		
5720.0		Measured, 2018-03-28	46.91	5.88	
		Deviation (%)	-3.28	1.91	
5600.0	Body	Measured, 2018-04-02	46.51	5.87	21.6
		Target Tissue	48.50	5.77	
		Deviation (%)	-4.10	1.73	
5500.0		Measured, 2018-04-02	46.70	5.73	
Deviation (%)		-3.71	-0.69		
5720.0		Measured, 2018-04-02	46.30	6.05	
		Deviation (%)	-4.54	4.85	
5600.0	Head	Measured, 2018-04-03	34.14	5.08	21.8
		Target Tissue	35.50	5.07	
		Deviation (%)	-3.83	0.20	
5500.0		Measured, 2018-04-03	35.23	4.93	
Deviation (%)		-0.76	-2.76		
5720.0		Measured, 2018-04-03	35.22	5.24	
		Deviation (%)	-0.79	3.35	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
5800.0	Body	Measured, 2018-03-28	46.38	6.13	22.3
		Target Tissue	48.20	6.00	
		Deviation (%)	-3.78	2.17	
5745.0		Measured, 2018-03-28	46.50	6.03	
Deviation (%)		-3.53	0.50		
5825.0		Measured, 2018-03-28	46.34	6.16	
Deviation (%)	-3.86	2.67			
5800.0	Body	Measured, 2018-04-02	47.38	6.06	21.5
		Target Tissue	48.20	6.00	
		Deviation (%)	-1.70	1.00	
5745.0		Measured, 2018-04-02	47.48	5.91	
Deviation (%)		-1.49	-1.50		
5825.0		Measured, 2018-04-02	47.62	6.10	
Deviation (%)	-1.20	1.67			
5800.0	Head	Measured, 2018-04-03	34.87	5.42	21.8
		Target Tissue	35.30	5.27	
		Deviation (%)	-1.22	2.85	
5745.0		Measured, 2018-04-03	35.04	5.35	
Deviation (%)		-0.74	1.52		
5825.0		Measured, 2018-04-03	34.95	5.46	
Deviation (%)	-0.99	3.61			

The composition of the brain & muscle tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		900		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.91	46.21	40.29	50.75	40.29	50.75	55.24	70.17	55.00	68.64
Salt (NaCl)	3.79	2.34	1.38	0.94	1.38	0.94	0.31	0.39	-	-
Sugar	56.93	51.17	57.90	-	57.90	-	-	-	-	-
HEC	0.25	0.15	0.24	0.10	0.24	0.10	-	-	-	-
Bactericide	0.12	0.08	0.18	-	0.18	-	-	-	-	-
Triton X-100	-	-	-	-	-	-	-	-	-	-
DGBE	-	-	-	-	-	-	44.45	70.17	45.00	31.37
Dielectric Constant	43.5	56.7	41.5	55.2	41.5	55.0	40.0	53.3	39.2	52.7
Conductivity (S/m)	0.87	0.94	0.90	0.97	0.97	1.05	1.40	1.52	1.80	1.95

Salt: 99 + % Pure Sodium Chloride

Sugar: 98 + % Pure Sucrose

Water: De-ionized, 16 MΩ⁺ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99 + % Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral Oil	11
Emulsifiers	9
Additives and Salt	2

14. Instruments List

Test Platform	SPEAG DASY5 Professional				
Location	SGS Korea Co., Ltd. 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, E&E Lab				
Manufacture	SPEAG				
Description	SAR Test System (Frequency range 300 MHz - 6 GHz)				
Software Reference	DASY52: 52.10.0(1446) SEMCAD X: 14.6.10(7417)				
Equipment	Type	Serial Number	Cal Date	Cal Interval	Cal Due
Robot	RX90B L	F13/5S7KC1/A/01	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1821	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1843	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1910	N/A	N/A	N/A
Verification Dipole	D750V3	1085	2017-03-15	Biennial	2019-03-15
Verification Dipole	D835V2	4d138	2017-04-24	Biennial	2019-04-24
Verification Dipole	D1750V2	1116	2017-07-21	Biennial	2019-07-21
Verification Dipole	D1900V2	5d033	2016-05-26	Biennial	2018-05-26
Verification Dipole	D2300V2	1028	2017-11-15	Biennial	2019-11-15
Verification Dipole	D2450V2	892	2017-04-21	Biennial	2019-04-21
Verification Dipole	D2600V2	1038	2017-05-30	Biennial	2019-05-30
Verification Dipole	D5GHzV2	1106	2017-05-26	Biennial	2019-05-26
DAE	DAE4	1340	2017-05-23	Annual	2018-05-23
E-Field Probe	EX3DV4	3862	2017-09-25	Annual	2018-09-25
E-Field Probe	EX3DV4	3791	2017-05-31	Annual	2018-05-31
E-Field Probe	EX3DV4	3933	2017-09-28	Annual	2019-09-28
Network Analyzer	E5071C	MY46111535	2017-05-23	Annual	2018-05-23
Power Meter	E4419B	GB43311125	2017-06-25	Annual	2018-06-25
Power Meter	E4416A	GB41292123	2017-12-13	Annual	2018-12-13
Power Sensor	E9300H	MY41495307	2017-06-25	Annual	2018-06-25
Power Sensor	E9300H	MY41495314	2017-06-25	Annual	2018-06-25
Power Sensor	E9327A	US40441371	2017-12-13	Annual	2018-12-13
Signal Generator	E8247C	MY43321024	2017-06-14	Annual	2018-06-14
Power Amplifier	2002-BBS2C4AEL	1029 D/C 0341	2017-12-07	Annual	2018-12-07
Power Amplifier	BLMA1060-10	1711221	2017-06-10	Annual	2018-06-10
Dual Directional Coupler	778D	MY52180497	2017-06-18	Annual	2018-06-18
Dual Directional Coupler	772D	MY52180226	2017-06-18	Annual	2018-06-18
LP Filter	LA-15N	LF02	2017-06-18	Annual	2018-06-18
LP Filter	LA-30N	LF03	2017-06-18	Annual	2018-06-18
LP Filter	LA-60N	LF04	2017-06-18	Annual	2018-06-18
Attenuator	05AS102-K03	A1	2017-12-08	Annual	2018-12-08
Attenuator	05AS102-K20	A3	2017-12-08	Annual	2018-12-08
Attenuator	05AS102-K20	A4	2017-12-08	Annual	2018-12-08
Hygro-Thermometer	BJ5478	12091382-1	2017-06-21	Annual	2018-06-21
Digital Thermometer	SDT25	17041500018	2017-08-11	Annual	2018-08-11
Communication Tester	MT8821C	6201502996	2017-09-14	Annual	2018-09-14
Spectrum Analyzer	FSV7	103082	2017-07-11	Annual	2018-07-11
Bluetooth Test Set	MT8852B	1219006	2017-06-10	Annual	2018-06-10

15 FCC Power Measurement Procedures

The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

16 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. Test highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

17 Maximum Output Power Specifications

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06

CDMA/GSM/UMTS Maximum Power

Mode / Band		Modulated Average
CDMA/EVDO BC10(§ 90S)	Maximum	25.5
	Nominal	25.0
CDMA/EVDO BC0 (§ 22H)	Maximum	25.0
	Nominal	24.5
PCS CDMA/EVDO	Maximum	25.0
	Nominal	24.5
GSM 850	Maximum	33.0
	Nominal	32.5
GSM 1900	Maximum	31.0
	Nominal	30.5
UMTS 850	Maximum	25.0
	Nominal	24.5
UMTS 1750	Maximum	25.0
	Nominal	24.5

LTE Maximum Power

Mode / Band		Modulated Average
LTE Band 71	Maximum	25.0
	Nominal	24.5
LTE Band 12	Maximum	25.3
	Nominal	24.8
LTE Band 13	Maximum	25.0
	Nominal	24.5
LTE Band 14	Maximum	25.0
	Nominal	24.5
LTE Band 26	Maximum	25.0
	Nominal	24.5
LTE Band 5	Maximum	25.0
	Nominal	24.5
LTE Band 66	Maximum	25.0
	Nominal	24.5
LTE Band 4	Maximum	25.0
	Nominal	24.5
LTE Band 25	Maximum	25.0
	Nominal	24.5
LTE Band 30	Maximum	25.0
	Nominal	24.5
LTE Band 7	Maximum	24.0
	Nominal	23.5
LTE Band 41(PC2)	Maximum	27.5
	Nominal	27.0
LTE Band 41(PC3)	Maximum	24.5
	Nominal	24.0

Bluetooth & WLAN Maximum Power

Mode / Band		Modulated Average
Bluetooth	Maximum	15.5
	Nominal	15.0
IEEE 802.11b(2.4 GHz) SISO	Maximum	20.5
	Nominal	20.0
IEEE 802.11a(5 GHz) SISO	Maximum	18.5
	Nominal	18.0

Reduced Power

Mode / Band		Modulated Average
PCS CDMA/EVDO	Maximum	20.5
	Nominal	20.0
GPRS/EDGE1900 4TX	Maximum	23.0
	Nominal	22.5
UMTS 1750	Maximum	20.5
	Nominal	20.0
LTE Band 66	Maximum	20.5
	Nominal	20.0
LTE Band 4	Maximum	20.5
	Nominal	20.0
LTE Band 25	Maximum	20.5
	Nominal	20.0
LTE Band 30	Maximum	21.5
	Nominal	21.0
LTE Band 7	Maximum	21.5
	Nominal	21.0
LTE Band 41(PC2)	Maximum	23.5
	Nominal	23.0
LTE Band 41(PC3)	Maximum	23.5
	Nominal	23.0

18. RF Conducted Power Measurement

- CDMA/GSM/UMTS Maximum Conducted power

Mode / Band	Frequency (MHz)	Channel	Service	Conducted Power (dBm)
CDMA BC10	820.10	564	RC3 / SO55	24.84
CDMA BC10	820.10	564	TDSO SO32	24.87
CDMA BC0	836.52	384	RC3 / SO55	24.49
CDMA BC0	836.52	384	TDSO SO32	24.77
PCS CDMA	1880.00	600	EVDO Rev. A	24.01
PCS CDMA	1880.00	600	TDSO SO32	24.20
GSM 850	836.60	190	GSM	32.80
GPRS 850	836.60	190	GPRS 4TX	28.13
GSM 1900	1880.00	661	GSM	29.47
UMTS 850	836.60	4183	RMC	24.67
UMTS 850	846.60	4233	RMC	24.69
UMTS 1750	1732.40	1412	RMC	24.05
UMTS 1900	1880.00	9400	RMC	24.01

- LTE Maximum Conducted power

Band	Bandwidth	Antenna Config.	Frequency (MHz)	Channel	Modulation	RB Size	RB Offset	Conducted Power (dBm)
LTE Band 71	20	N/A	680.50	133297	QPSK	1	0	24.81
LTE Band 12	10	N/A	707.50	23095	QPSK	1	25	24.57
LTE Band 13	10	N/A	782.00	23230	QPSK	1	0	24.58
LTE Band 14	10	N/A	793.00	23330	QPSK	1	0	24.75
LTE Band 26	15	N/A	831.50	26865	QPSK	1	74	24.37
LTE Band 5	10	N/A	836.50	20525	QPSK	1	0	24.26
LTE Band 66	20	N/A	1770.00	132572	QPSK	1	0	24.31
LTE Band 66	20	N/A	1745.00	132322	QPSK	1	0	24.28
LTE Band 25	20	N/A	1860.00	26140	QPSK	1	0	24.29
LTE Band 25	20	N/A	1905.00	26590	QPSK	1	0	24.07
LTE Band 30	10	Ant B	2310.00	27710	QPSK	1	0	24.50
LTE Band 30	10	N/A	2310.00	27710	QPSK	1	0	24.41
LTE Band 7	20	Ant B	2560.00	21350	QPSK	1	0	23.58
LTE Band 7	20	Ant A	2560.00	21350	QPSK	1	99	23.39
LTE Band 41	20	N/A	2549.50	40185	QPSK	1	0	26.96

- WLAN Maximum Conducted power

Mode / Band	Antenna	Frequency (MHz)	Channel	Conducted Power (dBm)
802.11b	2	2412.0	1	20.19
802.11b	1	2462.0	11	20.22
802.11a	2	5320.0	64	18.17
802.11a	2	5600.0	120	17.79
802.11a	2	5720.0	144	18.42

- WLAN MIMO Maximum Conducted power

Mode / Band	Bandwidth	Frequency (MHz)	Channel	Conducted Power (dBm) Ant1	Conducted Power (dBm) Ant2
802.11ac	80	5610	122	16.85	15.76

- Bluetooth Maximum Conducted power

Mode / Band	Frequency (MHz)	Channel	Conducted Power (dBm)
Bluetooth	2402.00	0	15.04

- CDMA/GSM/UMTS Reduced Conducted power

Mode / Band	Frequency (MHz)	Channel	Service	Conducted Power (dBm)
PCS CDMA	1880.00	600	TDSO SO32	19.90
GPRS 1900	1909.80	810	GPRS 4TX	21.89
UMTS 1750	1752.60	1513	RMC	19.98
UMTS 1900	1880.00	9400	RMC	19.98

- LTE FDD Reduced Conducted power

Band	Bandwidth	Antenna Config.	Frequency (MHz)	Channel	Modulation	RB Size	RB Offset	Conducted Power (dBm)
LTE Band 25	20	N/A	1905.00	26590	QPSK	1	0	20.50
LTE Band 30	10	Ant B	2310.00	27710	QPSK	1	0	21.08
LTE Band 7	20	Ant A	2560.00	21350	QPSK	50	25	21.46

- LTE TDD Reduced Conducted power

Band	Bandwidth	Component Carrier	Frequency (MHz)	Channel	Modulation	RB Size	RB Offset	Conducted Power (dBm)
LTE Band 41	20	PCC	2549.50	40185	OPSK	1	0	23.35
		SCC	2529.70	40185		1	99	

- WLAN Reduced Conducted power

Mode / Band	Antenna	Frequency (MHz)	Channel	Conducted Power (dBm)
802.11b	2	2412.0	1	14.90
802.11ac	2	5290.0	58	12.81
802.11ac	2	5690.0	138	13.37
802.11ac	2	5775.0	155	13.00

- WLAN MIMO Reduced Conducted power

Mode / Band	Bandwidth	Frequency (MHz)	Channel	Conducted Power (dBm) Ant1	Conducted Power (dBm) Ant2
802.11n	20	2437	6	13.36	13.00
802.11ac	80	5290.0	58	13.21	12.81
802.11ac	80	5775.0	155	13.07	13.00

19. SAR Data Summary

19.1 Head SAR data

Cell Phone+ LED Cover CDMA/EVDO Head SAR

EUT Position	Mode	Service	Ant State	Traffic Channel		Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
				Frequency (MHz)	Channel	Conducted Power	Tune-Up Limit				
Right Touch	CDMA BC10	RC3 / SO55	3	820.10	564	24.84	25.50	0.172	1.164	0.200	A17
Right Touch	CDMA BC0	RC3 / SO55	3	836.52	384	24.49	25.00	0.181	1.125	0.204	A18
Left Touch	PCS CDMA	EVDO Rev. A	77	1880.00	600	24.01	25.00	0.234	1.256	0.294	A19
Right Touch	GSM 850	GSM	N/A	836.60	190	32.80	33.00	0.138	1.047	0.144	A20
Left Touch	GSM 1900	GSM	N/A	1880.00	661	29.47	31.00	0.059	1.422	0.084	A21
Right Touch	UMTS 850	RMC	2	836.60	4183	24.67	25.00	0.194	1.079	0.209	A22
Left Touch	UMTS 1750	RMC	73	1732.40	1412	24.05	25.00	0.211	1.245	0.263	A23
Left Touch	UMTS 1900	RMC	77	1880.00	9400	24.01	25.00	0.098	1.256	0.123	A24

Cell Phone+ LED Cover LTE FDD Head SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna Conig	Traffic Channel		Modulation	RB Size	RB offset	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
					Frequency (MHz)	Channel				Conducted Power	Tune-Up Limit				
Right Touch	LTE 71	20	1	N/A	680.50	133297	QPSK	1	0	24.81	25.00	0.111	1.045	0.116	A25
Right Touch	LTE 12	10	2	N/A	707.50	23095	QPSK	1	25	24.57	25.30	0.107	1.159	0.124	A26
Right Touch	LTE 13	10	1	N/A	782.00	23230	QPSK	1	0	24.58	25.00	0.167	1.102	0.184	A27
Right Touch	LTE 14	10	1	N/A	793.00	23330	QPSK	1	0	24.75	25.00	0.160	1.059	0.169	A28
Right Touch	LTE 26	15	3	N/A	831.50	26865	QPSK	1	74	24.37	25.00	0.229	1.156	0.265	A29
Right Touch	LTE 5	10	3	N/A	836.50	20525	QPSK	1	0	24.26	25.00	0.240	1.186	0.285	A30
Left Touch	LTE 66	20	77	N/A	1770.00	132572	QPSK	1	0	24.31	25.00	0.209	1.172	0.245	A31
Left Touch	LTE 25	20	77	N/A	1860.00	26140	QPSK	1	0	24.29	25.00	0.179	1.178	0.211	A32
Left Touch	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	24.50	25.00	0.073	1.122	0.082	A33
Left Touch	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	1	0	23.58	24.00	0.089	1.102	0.098	A34

Cell Phone+ LED Cover LTE TDD Head SAR

EUT Position	Mode	Bandwidth (MHz)	Uplink	Traffic Channel		Modulation	RB Size	RB offset	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
				Frequency (MHz)	Channel				Conducted Power	Tune-Up Limit				
Left Touch	LTE 41	20	1 CC Uplink	2549.50	40185	QPSK	1	0	26.96	27.50	0.070	1.132	0.079	A35

Cell Phone+ LED Cover WLAN Head SAR

EUT Position	Mode	Antenna Cofig.	Traffic Channel		Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel	Conducted Power	Tune-Up Limit					
Right Touch	802.11b	2	2412.0	1	14.90	15.50	0.322	1.148	1.002	0.370	A36
Right Touch	802.11ac	2	5290.0	58	12.81	13.50	0.202	1.172	1.073	0.254	A38
Right Touch	802.11ac	2	5690.0	138	13.37	13.50	0.217	1.030	1.073	0.240	A40
Right Touch	802.11ac	2	5775.0	155	13.00	13.50	0.204	1.122	1.073	0.246	A41

Cell Phone+ LED Cover WLAN Head MIMO SAR

EUT Position	Mode	Bandwidth (MHz)	Traffic Channel		Power(dBm)				1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel	Conducted Power (Ant1)	Tune-Up Limit	Conducted Power (Ant1)	Tune-Up Limit					
Right Touch	802.11n	20	2437	6	13.36	13.50	13.00	13.50	0.300	1.122	1.022	0.344	A37
Right Touch	802.11ac	80	5290.0	58	13.21	13.50	12.81	13.50	0.207	1.172	1.083	0.263	A39

Cell Phone+ LED Cover Bluetooth Head SAR

EUT Position	Mode	Service	Traffic Channel		Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel	Conducted Power	Tune-Up Limit					
Right Touch	Bluetooth	FHSS	2402.00	0	15.04	15.50	0.311	1.112	1.294	0.448	A42

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(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.)

19.2 Body Worn SAR data

Cell Phone+ LED Cover GSM/UMTS/CDMA Body Worn SAR

EUT Position	Mode	Service	Ant State	Traffic Channel		Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
				Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit				
Rear	CDMA BC10	TDSO/SO32	3	820.10	564	15mm	24.84	25.50	0.248	1.164	0.289	A43
Rear	CDMA BC0	TDSO/SO32	3	836.52	384	15mm	24.49	25.00	0.241	1.130	0.272	A44
Rear	PCS CDMA	TDSO/SO32	77	1880.00	600	15mm	24.20	25.00	0.521	1.202	0.626	A45
Rear	GSM 850	GPRS 1TX	N/A	836.60	190	15mm	32.80	33.00	0.175	1.047	0.183	A46
Rear	GSM 1900	GPRS 1TX	N/A	1880.00	661	15mm	29.47	21.00	0.253	1.422	0.360	A47
Rear	UMTS850	RMC	3	836.60	4183	15mm	24.67	25.00	0.286	1.079	0.309	A48
Rear	UMTS1750	RMC	73	1732.40	1412	15mm	24.05	25.00	0.440	1.245	0.548	A49
Rear	UMTS1900	RMC	77	1880.00	9400	15mm	24.01	25.00	0.357	1.256	0.448	A50

Cell Phone+ LED Cover LTE FDD Body Worn SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna Conig	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Rear	LTE 71	20	33	N/A	680.50	133297	QPSK	1	0	15mm	24.81	25.00	0.189	1.045	0.198	A51
Rear	LTE 12	10	2	N/A	707.50	23095	QPSK	1	25	15mm	24.57	25.30	0.154	1.183	0.182	A52
Rear	LTE 13	10	3	N/A	782.00	23230	QPSK	1	0	15mm	24.58	25.00	0.272	1.102	0.300	A53
Rear	LTE 14	10	1	N/A	793.00	23330	QPSK	1	0	15mm	24.75	25.00	0.291	1.059	0.308	A54
Rear	LTE 26	15	70	N/A	831.50	26865	QPSK	1	74	15mm	24.37	25.00	0.242	1.156	0.280	A55
Rear	LTE 5	10	3	N/A	836.50	20525	QPSK	1	0	15mm	24.26	25.00	0.265	1.186	0.314	A56
Rear	LTE 66	20	16	N/A	1745.00	132322	QPSK	1	0	15mm	24.28	25.00	0.548	1.180	0.647	A57
Rear	LTE 25	20	77	N/A	1905.00	26590	QPSK	1	0	15mm	24.07	25.00	0.451	1.239	0.559	A58
Rear	LTE 30	10	N/A	Ant A	2310.00	27710	QPSK	1	0	15mm	24.41	25.00	0.243	1.146	0.278	A59
Rear	LTE 7	20	N/A	Ant A	2560.00	21350	QPSK	1	99	15mm	23.39	24.00	0.235	1.151	0.270	A60

Cell Phone+ LED Cover LTE TDD Body Worn SAR

EUT Position	Mode	Uplink	Bandwidth (MHz)	Component Carrier	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No.
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Rear	LTE41	1 CC Uplink	20	PCC	2549.50	40185	QPSK	1	0	15mm	26.96	27.50	0.261	1.132	0.295	A61

Cell Phone+ LED Cover WLAN Body Worn SAR

EUT Position	Mode	Antenna Conig	Traffic Channel		Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit					
Rear	802.11b	1	2462.0	11	15mm	20.22	20.50	0.087	1.067	1.002	0.093	A62
Rear	802.11a	2	5320.0	64	15mm	18.17	18.50	0.246	1.079	1.012	0.269	A63
Rear	802.11a	2	5600.0	120	15mm	17.79	18.50	0.440	1.178	1.012	0.525	A64
Rear	802.11a	2	5825.0	165	15mm	18.03	18.50	0.261	1.114	1.012	0.294	A66

Cell Phone+ LED Cover WLAN Body Worn MIMO SAR

EUT Position	Mode	Bandwidth (MHz)	Traffic Channel		Spacing	Power(dBm)				1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel		Conducted Power (Ant1)	Tune-Up Limit	Conducted Power (Ant1)	Tune-Up Limit					
Rear	802.11ac	80	5610.0	122	15mm	16.85	17.50	16.76	17.50	0.450	1.186	1.083	0.578	A65

Cell Phone+ LED Cover Bluetooth Body Worn SAR

EUT Position	Mode	Service	Traffic Channel		Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No.
			Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit					
Rear	Bluetooth	FHSS	2402.00	0	15mm	15.04	15.50	0.038	1.112	1.294	0.055	A67

19.3 Hotspot SAR data

Cell Phone+ LED Cover GSM/UMTS/CDMA Hotspot SAR

EUT Position	Mode	Service	Ant State	Traffic Channel		Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No
				Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit				
Rear	CDMA BC10	TDSO/SO32	3	820.10	564	10mm	24.87	25.50	0.385	1.156	0.445	A68
Rear	CDMA BC0	TDSO/SO32	3	836.52	384	10mm	24.77	25.00	0.456	1.054	0.481	A69
Bottom	PCS CDMA	TDSO/SO32	77	1880.00	600	10mm	19.90	20.50	0.472	1.148	0.542	A70
Rear	GSM 850	GPRS 4TX	N/A	836.60	190	10mm	28.13	28.50	0.249	1.089	0.271	A71
Bottom	GSM 1900	GPRS 4TX	N/A	1909.80	810	10mm	21.89	23.00	0.336	1.291	0.434	A72
Rear	UMTS850	RMC	3	846.60	4233	10mm	24.69	25.00	0.390	1.074	0.419	A73
Bottom	UMTS1750	RMC	73	1752.60	1513	10mm	19.98	20.50	0.609	1.127	0.686	A74
Bottom	UMTS1900	RMC	77	1880.00	9400	10mm	19.98	20.50	0.655	1.127	0.738	A75

Cell Phone+ LED Cover LTE FDD Hotspot SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna Conig	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Rear	LTE 71	20	33	N/A	680.50	133297	QPSK	1	0	10mm	24.81	25.00	0.265	1.045	0.277	A76
Rear	LTE 12	10	2	N/A	707.50	23095	QPSK	1	25	10mm	24.57	25.30	0.237	1.183	0.280	A77
Rear	LTE 13	10	3	N/A	782.00	23230	QPSK	1	0	10mm	24.58	25.00	0.359	1.102	0.396	A78
Rear	LTE 14	10	1	N/A	793.00	23330	QPSK	1	0	10mm	24.75	25.00	0.385	1.059	0.408	A79
Rear	LTE 26	15	70	N/A	831.50	26865	QPSK	1	74	10mm	24.37	25.00	0.376	1.156	0.435	A80
Rear	LTE 5	10	3	N/A	836.50	20525	QPSK	1	0	10mm	24.26	25.00	0.394	1.186	0.467	A81
Bottom	LTE 66	20	16	N/A	1770.00	132572	QPSK	50	0	10mm	20.36	20.50	0.672	1.033	0.694	A82
Bottom	LTE 25	20	77	N/A	1905.00	26590	QPSK	1	0	10mm	20.50	20.50	0.678	1.000	0.678	A83
Bottom	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	10mm	21.08	21.50	0.375	1.102	0.413	A84
Bottom	LTE 7	20	N/A	Ant A	2560.00	21350	QPSK	50	25	10mm	21.46	21.50	0.557	1.009	0.562	A85

Cell Phone+ LED Cover LTE TDD Hotspot SAR

EUT Position	Mode	Uplink	Bandwidth (MHz)	Component Carrier	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Bottom	LTE41	2 CC Uplink	20	PCC	2549.50	40185	QPSK	1	0	10mm	23.35	23.50	0.569	1.035	0.589	A86
				SCC	2529.70	40185		1	99							

Cell Phone+ LED Cover WLAN Hotspot SAR

EUT Position	Mode	Antenna Conig	Traffic Channel		Spacing	Power(dBm)		1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No
			Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit					
Top	802.11b	2	2412.0	1	10mm	20.19	20.50	0.217	1.074	1.002	0.234	A87
Top	802.11b	1	2462.0	11	10mm	20.22	20.50	0.107	1.067	1.002	0.114	A88
Rear	802.11a	2	5825.0	165	10mm	18.03	18.50	0.758	1.114	1.012	0.855	A89

Cell Phone+ LED Cover NII MIMO SAR

EUT Position	Mode	Bandwidth (MHz)	Traffic Channel		Spacing	Power(dBm)				1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No
			Frequency (MHz)	Channel		Conducted Power (Ant1)	Tune-Up Limit	Conducted Power (Ant1)	Tune-Up Limit					
Rear	802.11ac	80	5775.0	155	10mm	13.07	13.50	13.00	13.50	0.315	1.122	1.083	0.383	A90

Cell Phone+ LED Cover Bluetooth Hotspot SAR

EUT Position	Mode	Traffic Channel		Power(dBm)		Spacing	1-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	1-g Scaled SAR (W/kg)	Plot No
		Frequency (MHz)	Channel	Conducted Power	Tune-Up Limit						
Top	Bluetooth	2402.0	0	15.04	15.50	10 mm	0.067	1.112	1.294	0.096	A91

Report File No : F690501/RF-SAR002526-A1

Date of Issue : 2018-04-05

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.)

19.4 Simultaneous Transmission Scenario for Head SAR Worst Case

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	CDMA/EVDO BC10(§90S)	0.200	0.344	0.263	0.807
	CDMA/EVDO BC00(§22H)	0.204	0.344	0.263	0.811
	PCS CDMA/EVDO	0.232	0.344	0.263	0.839
	GSM/GPRS/EDGE850	0.144	0.344	0.263	0.751
	GSM/GPRS/EDGE1900	0.087	0.344	0.263	0.694
	UMTS 850	0.209	0.344	0.263	0.816
	UMTS 1750	0.263	0.344	0.263	0.870
	UMTS 1900	0.127	0.344	0.263	0.734
	LTE Band 71	0.116	0.344	0.263	0.723
	LTE Band 12	0.124	0.344	0.263	0.731
	LTE Band 13	0.184	0.344	0.263	0.791
	LTE Band 14	0.169	0.344	0.263	0.776
	LTE Band 26 (Cell)	0.265	0.344	0.263	0.872
	LTE Band 5 (Cell)	0.285	0.344	0.263	0.892
	LTE Band 66 (AWS)	0.245	0.344	0.263	0.852
	LTE Band 25 (PCS)	0.218	0.344	0.263	0.825
	LTE Band 30	0.082	0.344	0.263	0.689
	LTE Band 7	0.098	0.344	0.263	0.705
	LTE Band 41	0.061	0.344	0.263	0.668

19.4 Simultaneous Transmission Scenario for Body Worn Worst Case

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body Worn	CDMA/EVDO BC10(§90S)	0.289	0.578	0.867
	CDMA/EVDO BC00(§22H)	0.272	0.578	0.850
	PCS CDMA/EVDO	0.626	0.578	1.204
	GSM/GPRS/EDGE850	0.183	0.578	0.761
	GSM/GPRS/EDGE1900	0.360	0.578	0.938
	UMTS 850	0.309	0.578	0.887
	UMTS 1750	0.548	0.578	1.126
	UMTS 1900	0.448	0.578	1.026
	LTE Band 71	0.198	0.578	0.776
	LTE Band 12	0.182	0.578	0.760
	LTE Band 13	0.300	0.578	0.878
	LTE Band 14	0.308	0.578	0.886
	LTE Band 26 (Cell)	0.280	0.578	0.858
	LTE Band 5 (Cell)	0.314	0.578	0.892
	LTE Band 66 (AWS)	0.647	0.578	1.225
	LTE Band 25 (PCS)	0.559	0.578	1.137
	LTE Band 30	0.278	0.578	0.856
	LTE Band 7	0.270	0.578	0.848
	LTE Band 41	0.295	0.578	0.873

19.5 Simultaneous Transmission Scenario for Hotspot Worst Case

Exposure Condition	Mode	2G/3G/4G	2.4 GHz WLAN Ant1 SAR (W/kg)	2.4 GHz WLAN Ant2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot	CDMA/EVDO BC10(\$90S)	0.445	0.114	0.234	0.383	1.176
	CDMA/EVDO BC00(\$22H)	0.481	0.114	0.234	0.383	1.212
	PCS CDMA/EVDO	0.542	0.114	0.234	0.383	1.273
	GSM/GPRS/EDGE850	0.271	0.114	0.234	0.383	1.002
	GSM/GPRS/EDGE1900	0.434	0.114	0.234	0.383	1.165
	UMTS 850	0.419	0.114	0.234	0.383	1.150
	UMTS 1750	0.686	0.114	0.234	0.383	1.417
	UMTS 1900	0.738	0.114	0.234	0.383	1.469
	LTE Band 71	0.277	0.114	0.234	0.383	1.008
	LTE Band 12	0.280	0.114	0.234	0.383	1.011
	LTE Band 13	0.396	0.114	0.234	0.383	1.127
	LTE Band 14	0.408	0.114	0.234	0.383	1.139
	LTE Band 26 (Cell)	0.435	0.114	0.234	0.383	1.166
	LTE Band 5 (Cell)	0.467	0.114	0.234	0.383	1.198
	LTE Band 66 (AWS)	0.694	0.114	0.234	0.383	1.425
	LTE Band 25 (PCS)	0.678	0.114	0.234	0.383	1.409
	LTE Band 30	0.413	0.114	0.234	0.383	1.144
	LTE Band 7	0.562	0.114	0.234	0.383	1.293
	LTE Band 41	0.589	0.114	0.234	0.383	1.320

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Appendix B

B.1 Calibration certificate for Probe
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B.3 Calibration certificate for Dipole

Appendix A.1 Verification Test Plots for 750 MHz Head

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [750MHz Verification Head 2018_03_31\(1\).da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750$ MHz; $\sigma = 0.927$ S/m; $\epsilon_r = 40.955$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;

- Sensor-Surface: 1.4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017

- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821

- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Verification/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.11 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

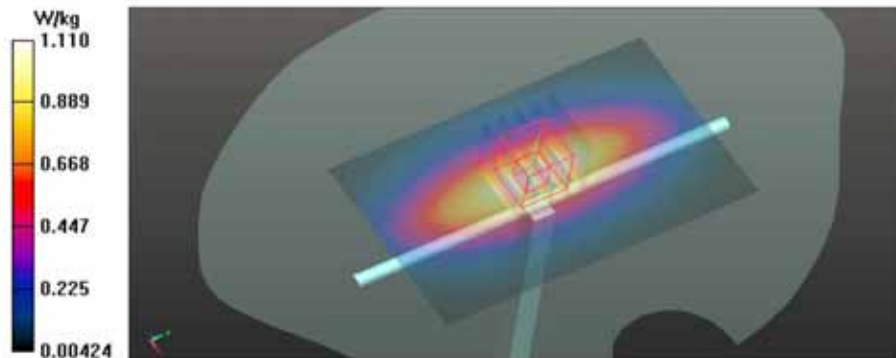
dx=8mm, dy=8mm, dz=5mm

Reference Value = 31.07 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.858 W/kg; SAR(10 g) = 0.571 W/kg

Maximum value of SAR (measured) = 1.13 W/kg



Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [750MHz Verification Head 2018_03_31\(2\).da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.853 \text{ S/m}$; $\epsilon_r = 42.369$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Verification/Area Scan (61x101x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 1.14 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

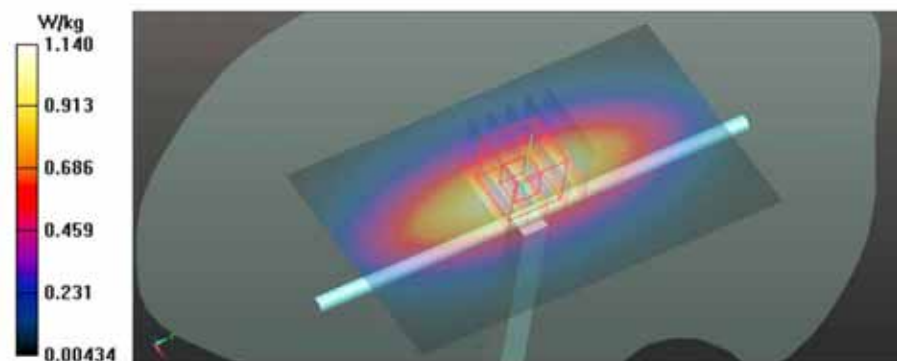
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 32.85 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.882 W/kg; SAR(10 g) = 0.587 W/kg

Maximum value of SAR (measured) = 1.15 W/kg



Appendix A.2 Verification Test Plots for 750 MHz Body

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [750MHz Verification Body 2018_03_31 \(1\).da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750$ MHz; $\sigma = 0.957$ S/m; $\epsilon_r = 55.82$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Verification/Area Scan (61x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.11 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

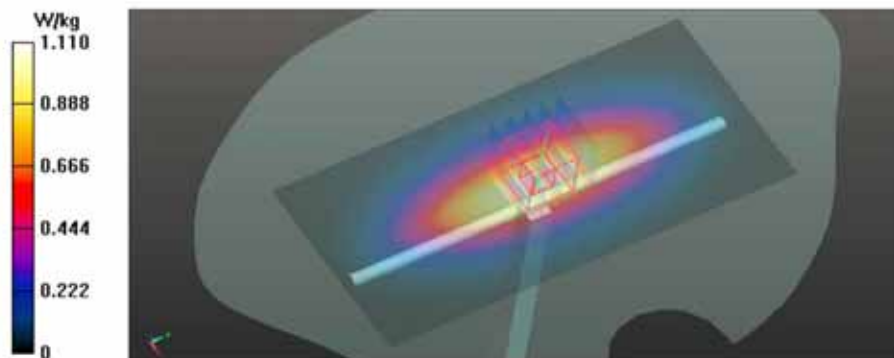
dx=8mm, dy=8mm, dz=5mm

Reference Value = 36.38 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.847 W/kg; SAR(10 g) = 0.567 W/kg

Maximum value of SAR (measured) = 1.12 W/kg



Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [750MHz Verification Body 2018_03_31\(2\).da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 55.726$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Verification/Area Scan (61x131x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 1.15 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

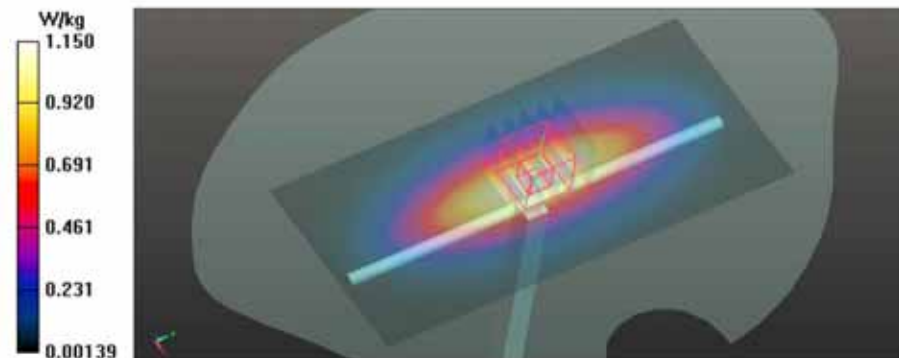
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 35.87 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.877 W/kg; SAR(10 g) = 0.588 W/kg

Maximum value of SAR (measured) = 1.15 W/kg



Appendix A.3 Verification Test Plots for 835 MHz Head

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [835MHz Verification Head 2018_04_02.da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d138

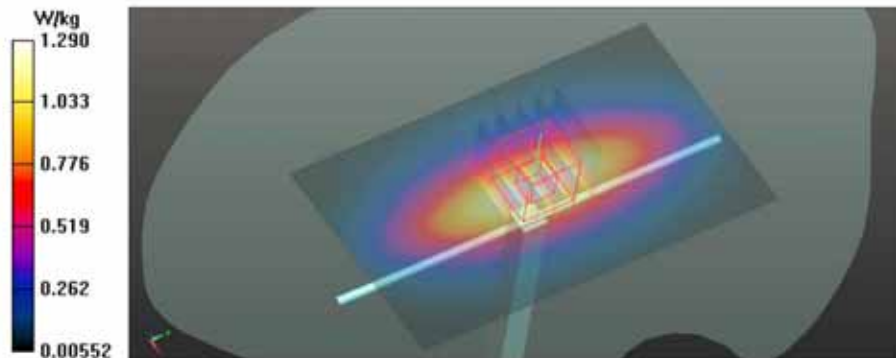
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.894$ S/m; $\epsilon_r = 40.47$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/835MHz Verification/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.07 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.964 W/kg; SAR(10 g) = 0.633 W/kg
Maximum value of SAR (measured) = 1.28 W/kg



Appendix A.4 Verification Test Plots for 835 MHz Body

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [835MHz Verification Body 2018_03_29.da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d138

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.958$ S/m; $\epsilon_r = 55.464$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/835MHz Verification Body/Area Scan (61x101x1): Interpolated grid:

$dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 1.29 W/kg

Verification/835MHz Verification Body/Zoom Scan (5x5x7)/Cube 0: Measurement

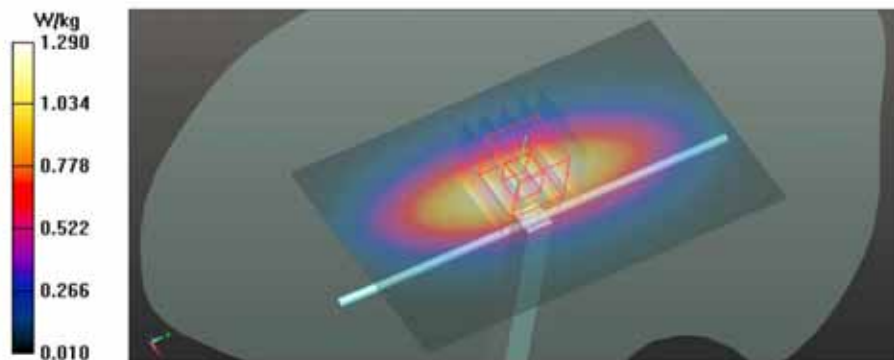
grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 37.35 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.986 W/kg; SAR(10 g) = 0.666 W/kg

Maximum value of SAR (measured) = 1.27 W/kg



Appendix A.5 Verification Test Plots for 1750 MHz Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1750MHz Verification Head 2018_04_01.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1116

Communication System: UID 0, CW (0); Frequency: 1750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1750$ MHz; $\sigma = 1.409$ S/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.73, 8.73, 8.73); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1750MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.38 W/kg

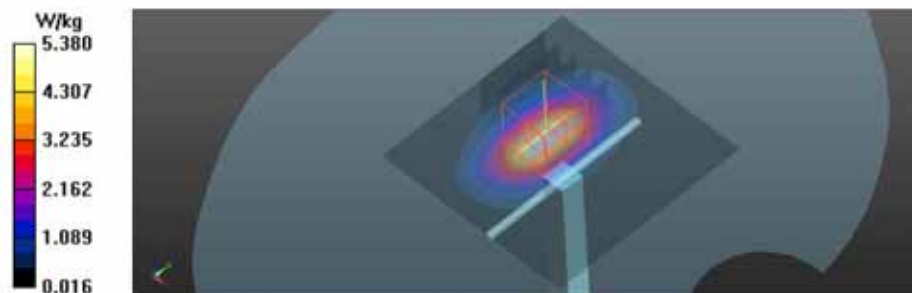
Verification/1750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.03 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 6.76 W/kg

SAR(1 g) = 3.61 W/kg; SAR(10 g) = 1.88 W/kg

Maximum value of SAR (measured) = 5.56 W/kg



Appendix A.6 Verification Test Plots for 1750 MHz Body

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1750MHz Verification Body 2018_03_29 da53-0](#)

Input Power : 100 mW

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1116

Communication System: UID 0, CW (0); Frequency: 1750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1750$ MHz; $\sigma = 1.511$ S/m; $\epsilon_r = 51.202$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.37, 8.37, 8.37); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1750MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.71 W/kg

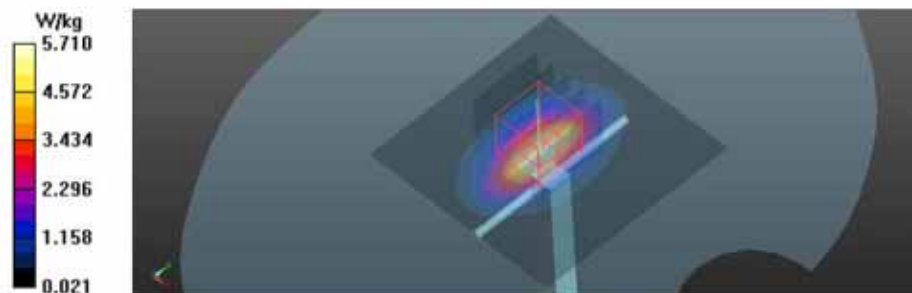
Verification/1750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 62.20 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 6.59 W/kg

SAR(1 g) = 3.81 W/kg; SAR(10 g) = 2.05 W/kg

Maximum value of SAR (measured) = 5.70 W/kg



Appendix A.7 Verification Test Plots for 1900 MHz Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [1900MHz Verification Head 2018_04_01.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 38.091$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.39, 8.39, 8.39); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.43 W/kg

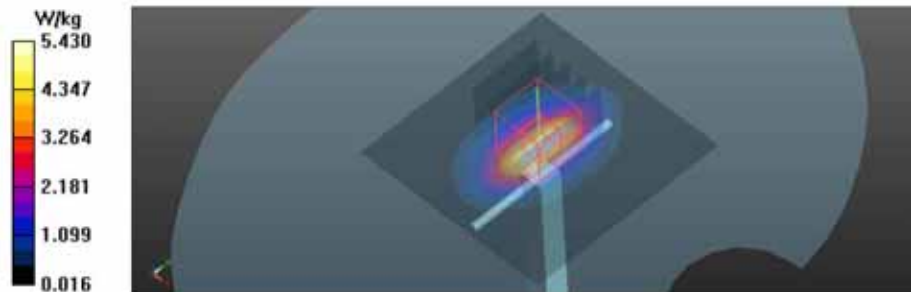
Verification/1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 64.48 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 7.02 W/kg

SAR(1 g) = 3.65 W/kg; SAR(10 g) = 1.84 W/kg

Maximum value of SAR (measured) = 5.71 W/kg



Appendix A.8 Verification Test Plots for 1900 MHz Body

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1900MHz Verification Body 2018_04_01.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

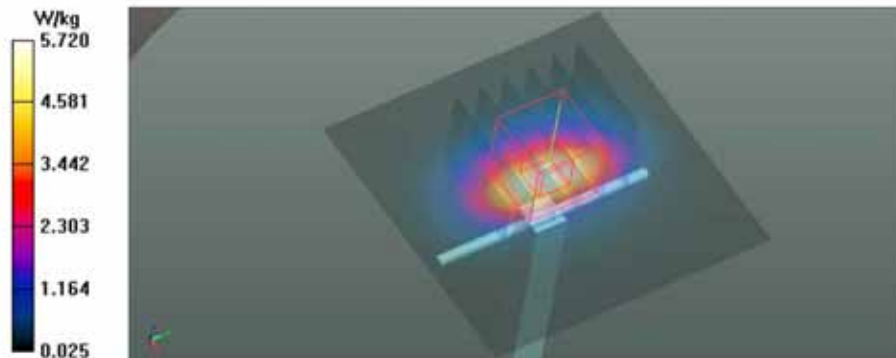
Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.511$ S/m; $\epsilon_r = 54.934$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.72 W/kg

Verification/1900MHz Verification/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.68 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 6.51 W/kg
SAR(1 g) = 3.9 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 5.62 W/kg



Appendix A.9 Verification Test Plots for 2300 MHz Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2300MHz Verification Head 2018_03_28_da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.1 °C

DUT: Dipole 2300 MHz D2300V2; Type: D2300V3; Serial: D2300V3 - SN:1028

Communication System: UID 0, CW (0); Frequency: 2300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2300$ MHz; $\sigma = 1.678$ S/m; $\epsilon_r = 39.669$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(7.22, 7.22, 7.22); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2300 MHz Verification/Area Scan (61x101x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 8.04 W/kg

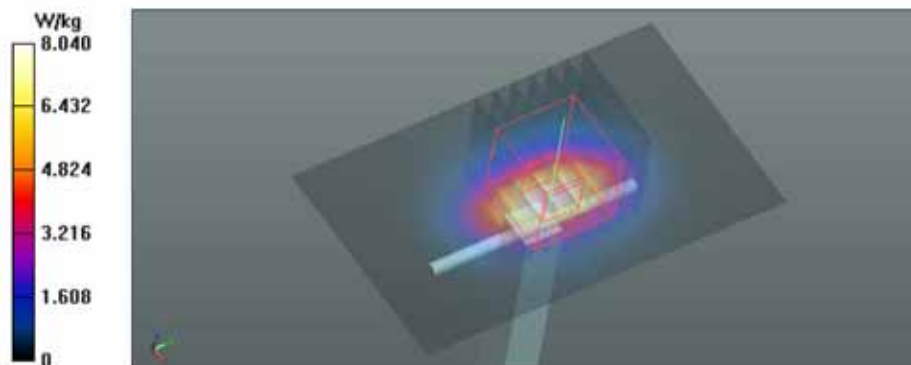
Verification/2300 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 67.05 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 9.91 W/kg

SAR(1 g) = 4.62 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 7.91 W/kg



Appendix A.10 Verification Test Plots for 2300 MHz Body

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2300MHz Verification Body_2018_03_30.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 21.7 °C

DUT: Dipole 2300 MHz D2300V2; Type: D2300V3; Serial: D2300V3 - SN:1028

Communication System: UID 0, CW (0); Frequency: 2300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2300$ MHz; $\sigma = 1.8$ S/m; $\epsilon_r = 51.94$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3933; ConvF(8.26, 8.26, 8.26); Calibrated: 2017-09-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2300MHz Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 7.26 W/kg

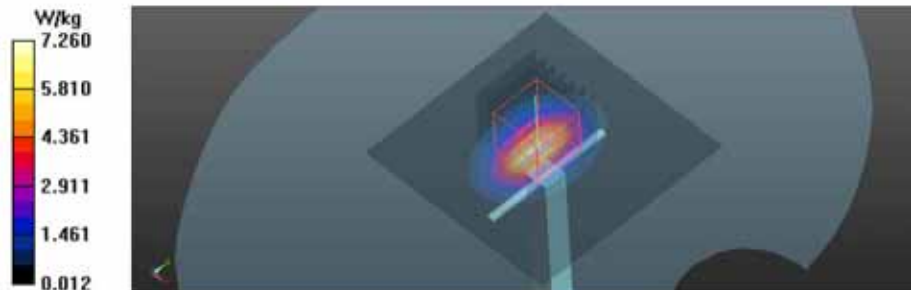
Verification/2300MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 65.31 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 8.75 W/kg

SAR(1 g) = 4.49 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 7.25 W/kg



Appendix A.11 Verification Test Plots for 2450 MHz Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Verification Head 2018_03_28_da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.0 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:892

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.861$ S/m; $\epsilon_r = 38.639$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

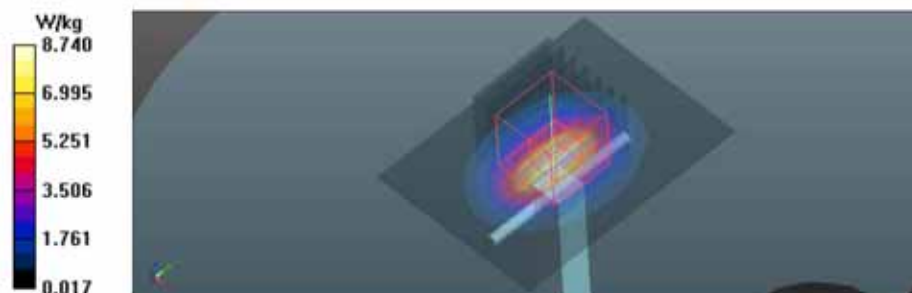
DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(6.88, 6.88, 6.88); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 8.74 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 69.81 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 10.9 W/kg
SAR(1 g) = 4.9 W/kg; SAR(10 g) = 2.21 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 8.50 W/kg



Appendix A.12 Verification Test Plots for 2450 MHz Body

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Verification Body 2018_03_30.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 21.7 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:892

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.938$ S/m; $\epsilon_r = 50.835$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

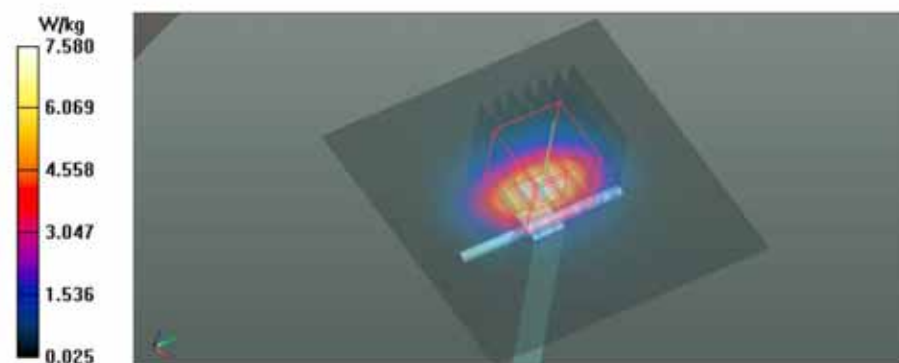
- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450MHz Verification Body/Area Scan (91x91x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 7.58 W/kg

Verification/2450MHz Verification Body/Zoom Scan (7x7x7)/Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.13 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 9.03 W/kg
SAR(1 g) = 4.72 W/kg; SAR(10 g) = 2.27 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 7.55 W/kg



Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Verification Body 2018_04_02 da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.8 °C Tissue Temp : 21.4 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:892

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.993$ S/m; $\epsilon_r = 50.464$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

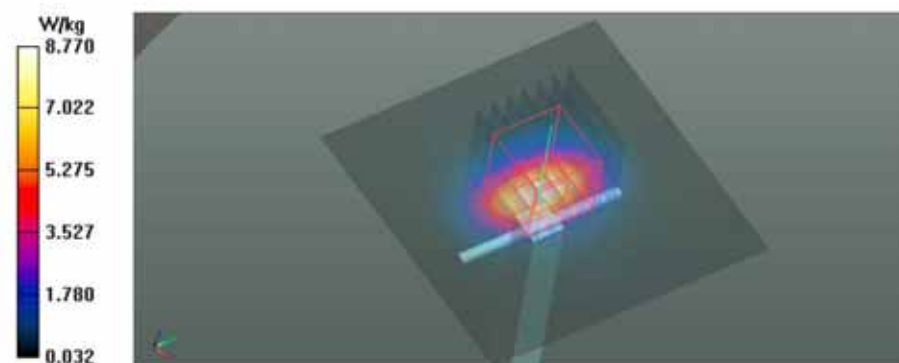
- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450MHz Verification Body/Area Scan (91x91x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 8.77 W/kg

Verification/2450MHz Verification Body/Zoom Scan (7x7x7)/Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 67.30 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.26 W/kg; SAR(10 g) = 2.48 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 8.59 W/kg



Appendix A.13 Verification Test Plots for 2600 MHz Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2600MHz Verification Head 2018_03_28.da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.1 °C

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1038

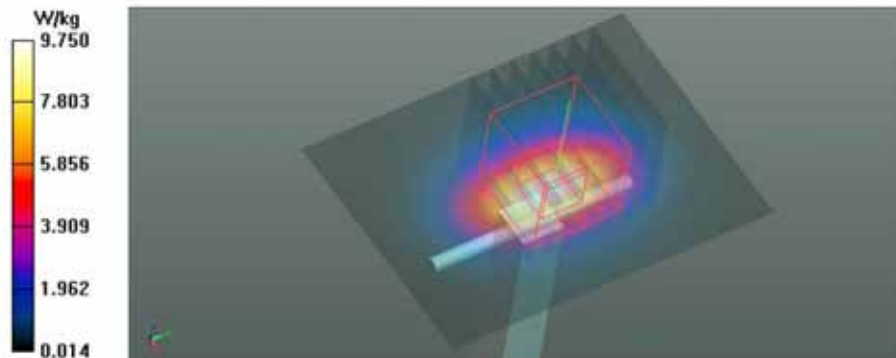
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2600$ MHz; $\sigma = 2.01$ S/m; $\epsilon_r = 38.153$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.74, 6.74, 6.74); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2600 MHz Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.75 W/kg

Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 69.33 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 12.1 W/kg
SAR(1 g) = 5.7 W/kg; SAR(10 g) = 2.64 W/kg
Maximum value of SAR (measured) = 9.72 W/kg



Appendix A.14 Verification Test Plots for 2600 MHz Body

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2600MHz Verification Body 2018_03_30.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 21.8 °C

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1038

Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2600$ MHz; $\sigma = 2.22$ S/m; $\epsilon_r = 51.735$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.51, 7.51, 7.51); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2600MHz Body Verification/Area Scan (91x91x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 8.22 W/kg

Verification/2600MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

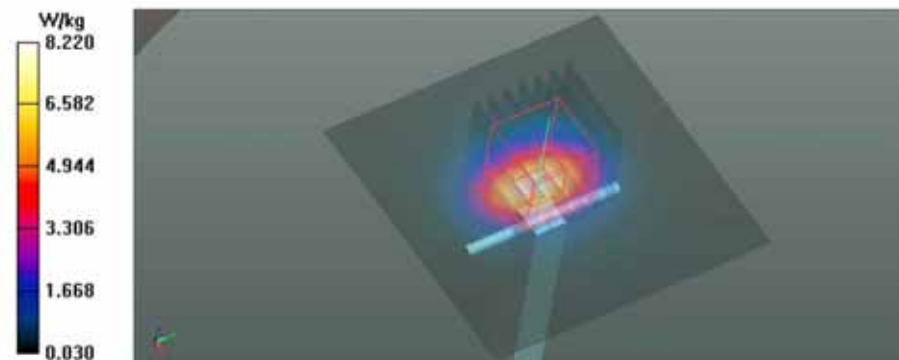
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 60.31 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 9.96 W/kg

SAR(1 g) = 5.06 W/kg; SAR(10 g) = 2.38 W/kg

Maximum value of SAR (measured) = 8.25 W/kg



Appendix A.15 Verification Test Plots for 5 GHz Head

Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [5300MHz Verification Head 2018_04_03.da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5300$ MHz; $\sigma = 4.745$ S/m; $\epsilon_r = 35.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY52 Configuration:

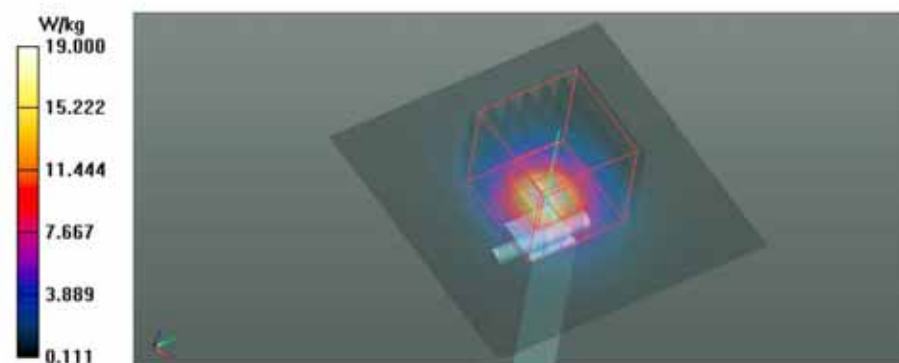
- Probe: EX3DV4 - SN3862; ConvF(5.11, 5.11, 5.11); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5300MHz Body Verification/Area Scan (61x61x1): Interpolated grid:
 $dx=1.000$ mm, $dy=1.000$ mm

Info: Interpolated medium parameters used for SAR evaluation.
 Maximum value of SAR (interpolated) = 19.0 W/kg

Verification/5300MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement
 grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm
 Reference Value = 69.83 V/m; Power Drift = -0.19 dB
 Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.34 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
 Maximum value of SAR (measured) = 19.5 W/kg



Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5600MHz Verification Head 2018_04_03.da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.079$ S/m; $\epsilon_r = 34.143$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.78, 4.78, 4.78); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5600MHz Verification Head/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 20.2 W/kg

Verification/5600MHz Verification Head/Zoom Scan (7x7x7)/Cube 0: Measurement

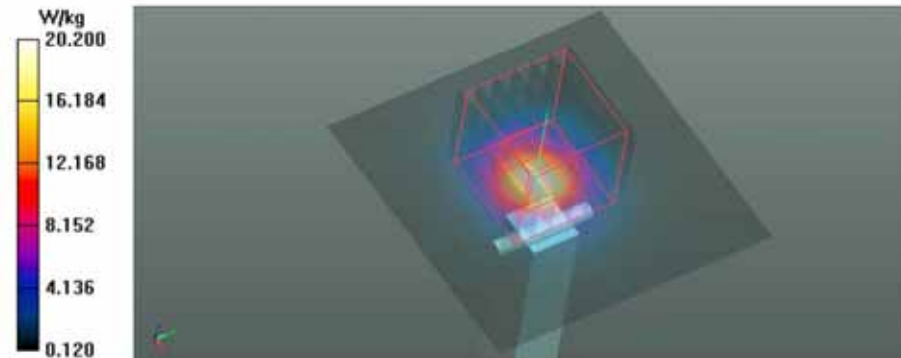
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.65 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 32.0 W/kg

SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.42 W/kg

Maximum value of SAR (measured) = 20.7 W/kg



Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [5800MHz Verification Head 2018_04_03.da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800$ MHz; $\sigma = 5.416$ S/m; $\epsilon_r = 34.87$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.75, 4.75, 4.75); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5800MHz Verification Head/Area Scan (61x61x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 20.2 W/kg

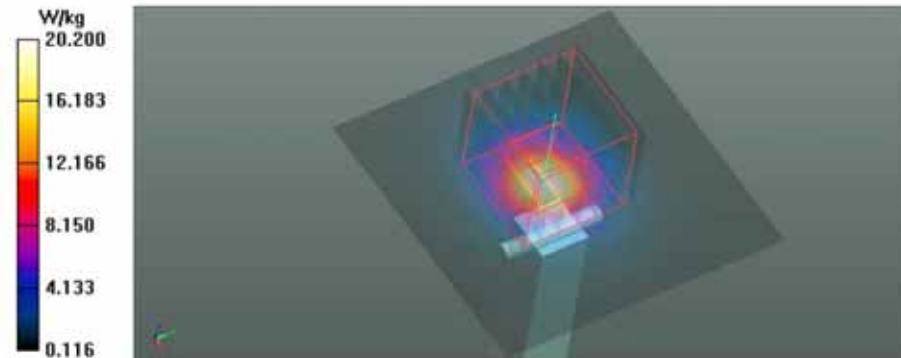
Verification/5800MHz Verification Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 64.81 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 33.2 W/kg

SAR(1 g) = 8 W/kg; SAR(10 g) = 2.38 W/kg

Maximum value of SAR (measured) = 20.7 W/kg



Appendix A.16 Verification Test Plots for 5 GHz Body

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [5300MHz Verification Body 2018_03_28.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5300$ MHz; $\sigma = 5.462$ S/m; $\epsilon_r = 47.917$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

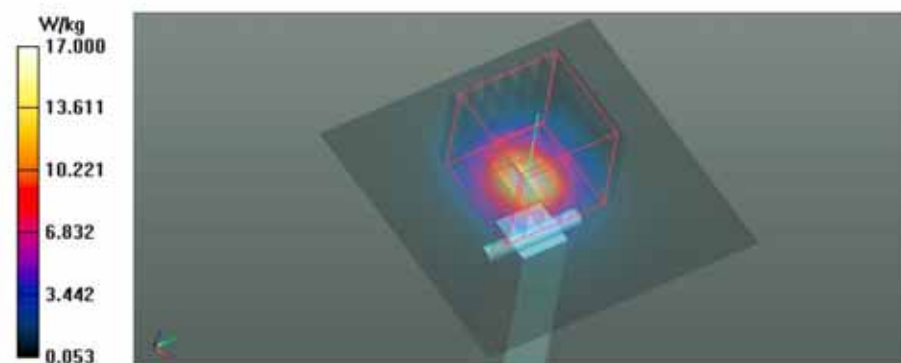
- Probe: EX3DV4 - SN3862; ConvF(4.37, 4.37, 4.37); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5300MHz Body Verification/Area Scan (61x61x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 17.0 W/kg

Verification/5300MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement
grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.00 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 25.6 W/kg
SAR(1 g) = 7.42 W/kg; SAR(10 g) = 2.17 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 17.7 W/kg



Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5300MHz Verification Body 2018_04_02 da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.8 °C Tissue Temp : 21.6 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5300$ MHz; $\sigma = 5.343$ S/m; $\epsilon_r = 47.145$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.37, 4.37, 4.37); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5300MHz Body Verification/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 17.5 W/kg

Verification/5300MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=4mm, dy=4mm, dz=1.4mm

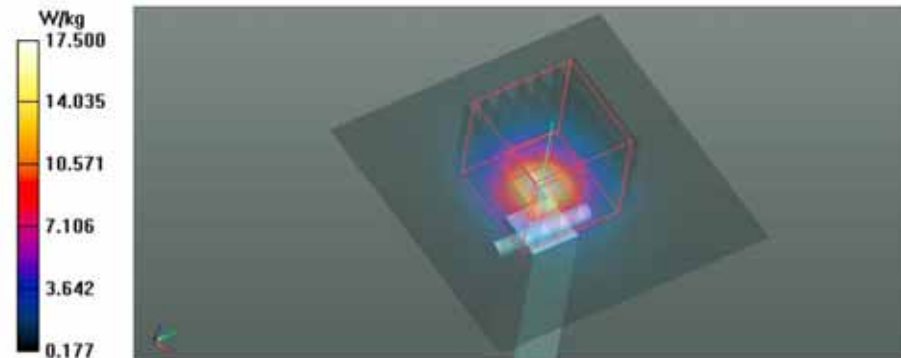
Reference Value = 62.84 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 7.5 W/kg; SAR(10 g) = 2.29 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 17.7 W/kg



Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5600MHz Verification Body 2018_03_28.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.675$ S/m; $\epsilon_r = 47.146$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(3.9, 3.9, 3.9); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5600MHz Body Verification/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.7 W/kg

Verification/5600MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

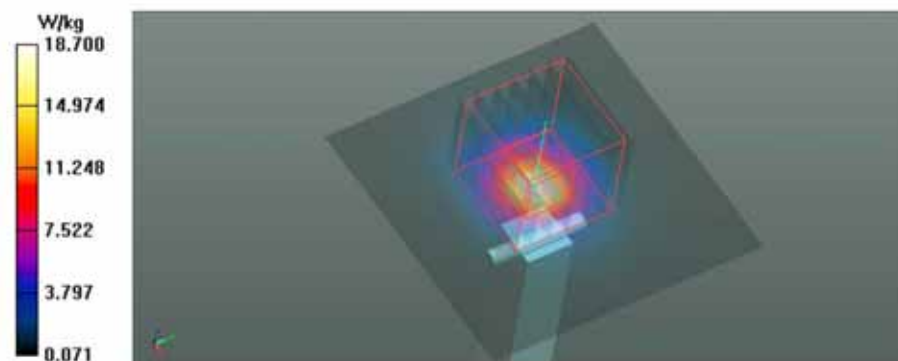
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.21 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 29.1 W/kg

SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.26 W/kg

Maximum value of SAR (measured) = 19.4 W/kg



Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5600MHz Verification Body 2018_04_02 da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.8 °C Tissue Temp : 21.6 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.868$ S/m; $\epsilon_r = 46.505$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(3.9, 3.9, 3.9); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5600MHz Body Verification/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.8 W/kg

Verification/5600MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

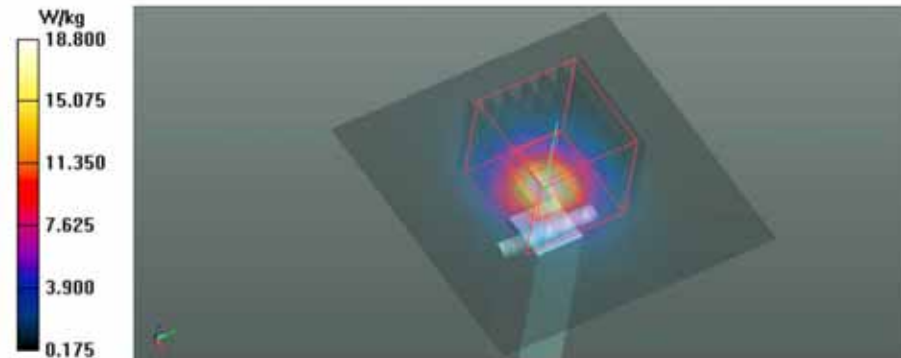
grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 63.35 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 27.3 W/kg

SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.32 W/kg

Maximum value of SAR (measured) = 18.7 W/kg



Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5800MHz Verification Body 2018_03_28.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.132$ S/m; $\epsilon_r = 46.379$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.09, 4.09, 4.09); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5800MHz Body Verification/Area Scan (61x61x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 18.1 W/kg

Verification/5800MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

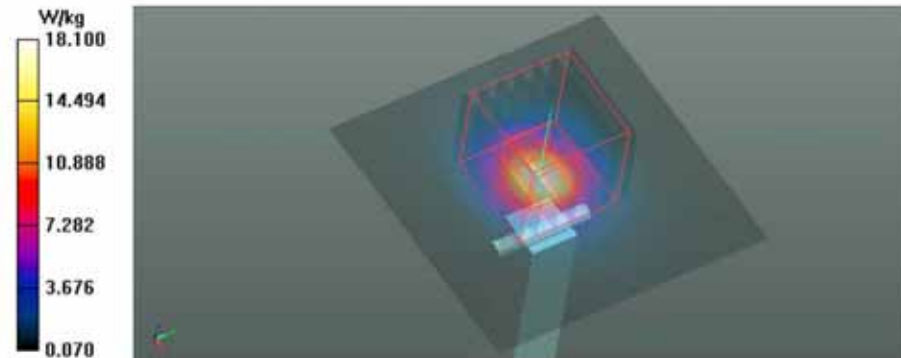
grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 60.64 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 29.4 W/kg

SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.13 W/kg

Maximum value of SAR (measured) = 18.8 W/kg



Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5800MHz Verification Body 2018_04_02 da53:0](#)

Input Power : 100 mW

Ambient Temp : 22.8 °C Tissue Temp : 21.5 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.061$ S/m; $\epsilon_r = 47.378$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.09, 4.09, 4.09); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5800MHz Body Verification/Area Scan (61x61x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 19.3 W/kg

Verification/5800MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement

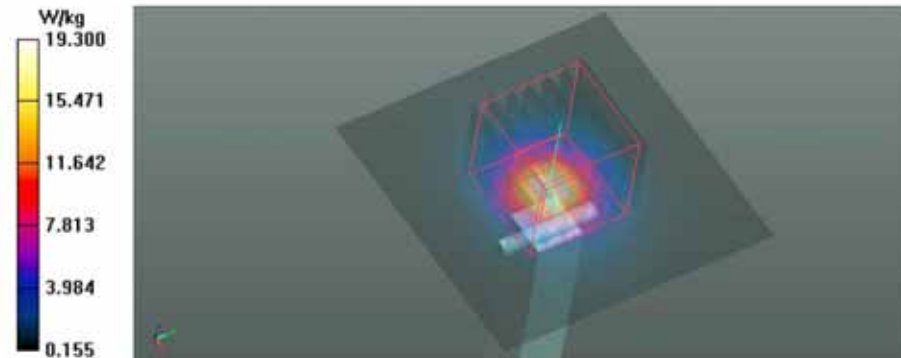
grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 62.89 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 28.7 W/kg

SAR(1 g) = 7.61 W/kg; SAR(10 g) = 2.3 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



Appendix A.17 SAR Test Plots for Cell Phone+ LED View Cover CDMA BC10(\$90S)

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC10_Right Touch_CH564_Head.da53.0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA DCN (0); Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 820.1$ MHz; $\sigma = 0.877$ S/m; $\epsilon_r = 40.495$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA BC10_Right Touch_CH564_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.221 W/kg

Head/CDMA BC10_Right Touch_CH564_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm

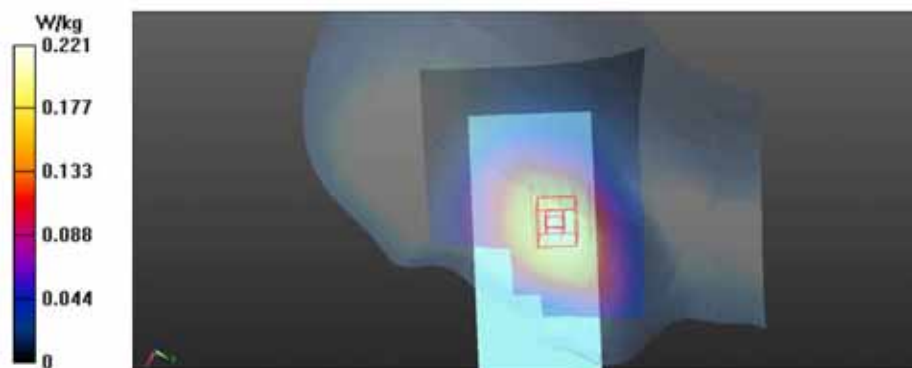
Reference Value = 6.092 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.172 W/kg; SAR(10 g) = 0.135 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.210 W/kg



Appendix A.18 SAR Test Plots for Cell Phone+ LED View Cover CDMA BC0(\$22H)

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC0_Right Touch_CH384_Head.da53-0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA DCN (0); Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 837$ MHz; $\sigma = 0.897$ S/m; $\epsilon_r = 40.465$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA BC0_Right Touch_CH384_Head/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.232 W/kg

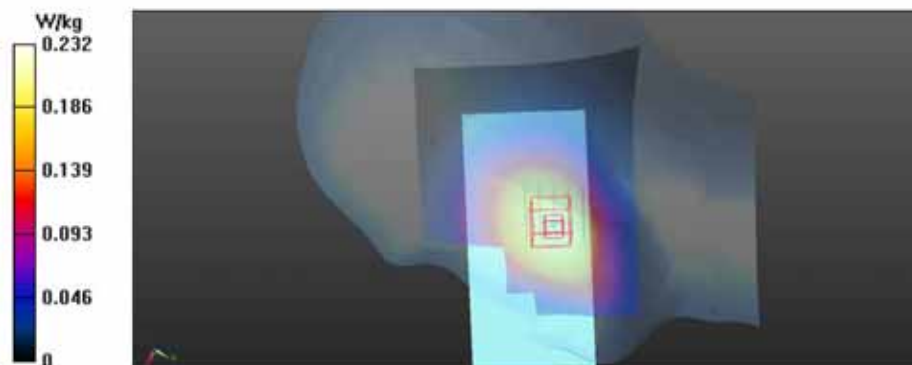
Head/CDMA BC0_Right Touch_CH384_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 6.375 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.238 W/kg

SAR(1 g) = 0.181 W/kg; SAR(10 g) = 0.142 W/kg

Maximum value of SAR (measured) = 0.219 W/kg



Appendix A.19 SAR Test Plots for Cell Phone+ LED View Cover PCS CDMA/EVDO

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [PCS CDMA_Left Touch_CH600_Head.da53-0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA PCS 1xRTT/EVDO (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.363$ S/m; $\epsilon_r = 38.122$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.39, 8.39, 8.39); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/PCS CDMA_Left Touch_CH600_Head/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.354 W/kg

Head/PCS CDMA_Left Touch_CH600_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 6.967 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.415 W/kg
SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.142 W/kg
Maximum value of SAR (measured) = 0.349 W/kg



Appendix A.20 SAR Test Plots for Cell Phone+ LED View Cover GSM850 Head

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [GSM850_Right Touch_CH190_Head.da53:0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, GSM850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 837$ MHz; $\sigma = 0.897$ S/m; $\epsilon_r = 40.465$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM850_Right Touch_CH190_Head/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.180 W/kg

Head/GSM850_Right Touch_CH190_Head/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.434 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.138 W/kg; SAR(10 g) = 0.107 W/kg
Maximum value of SAR (measured) = 0.170 W/kg



Appendix A.21 SAR Test Plots for Cell Phone+ LED View Cover GSM1900 Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [GSM1900_Left Touch_CH661_Head.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, GSM1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.363$ S/m; $\epsilon_r = 38.122$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.39, 8.39, 8.39); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM1900_Left Touch_CH661_Head/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.0783 W/kg

Head/GSM1900_Left Touch_CH661_Head/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 6.064 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.0820 W/kg

SAR(1 g) = 0.059 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.0742 W/kg



Appendix A.22 SAR Test Plots for Cell Phone+ LED View Cover UMTS 850 Head

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: UMTS 850_Right Touch_CH4183_Head.da53:0

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 837$ MHz; $\sigma = 0.897$ S/m; $\epsilon_r = 40.465$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 850_Right Touch_CH4183_Head/Area Scan (81x101x1): Interpolated
grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.267 W/kg

Head/UMTS 850_Right Touch_CH4183_Head/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 6.311 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.280 W/kg
SAR(1 g) = 0.194 W/kg; SAR(10 g) = 0.151 W/kg
Maximum value of SAR (measured) = 0.239 W/kg



Appendix A.23 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1750 Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 1750_Left Touch_CH1412_Head.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WCDMA4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.392$ S/m; $\epsilon_r = 38.451$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.73, 8.73, 8.73); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1750_Left Touch_CH1412_Head/Area Scan (81x101x1): Interpolated
grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.307 W/kg

Head/UMTS 1750_Left Touch_CH1412_Head/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.656 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.137 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.279 W/kg



Appendix A.24 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1900 Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [UMTS 1900_Left Touch_CH9400_Head.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.363$ S/m; $\epsilon_r = 38.122$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.39, 8.39, 8.39); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1900_Left Touch_CH9400_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.146 W/kg

Head/UMTS 1900_Left Touch_CH9400_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.412 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.150 W/kg

SAR(1 g) = 0.098 W/kg; SAR(10 g) = 0.066 W/kg

Maximum value of SAR (measured) = 0.131 W/kg



Appendix A.25 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 71 Head

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 71_20MHz_1RB_0 Offset_QPSK_Right Touch_CH133297_Head.da53:0

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 71 (0); Frequency: 680.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 680.5$ MHz; $\sigma = 0.871$ S/m; $\epsilon_r = 41.589$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Right Touch_CH133297_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.126 W/kg

Head/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Right Touch_CH133297_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

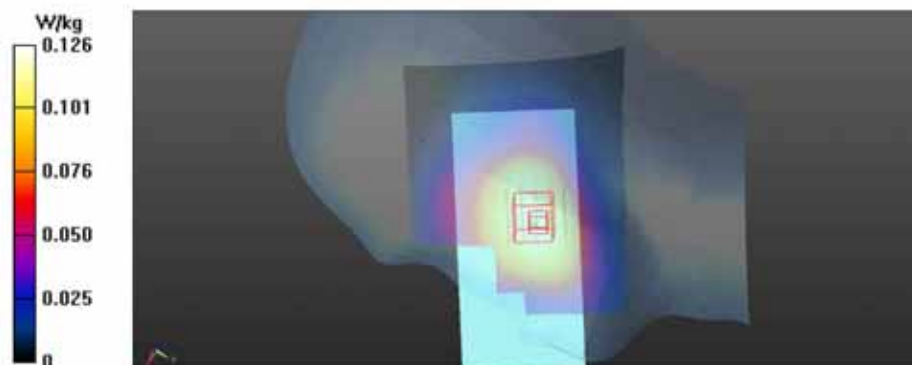
Reference Value = 6.437 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.134 W/kg

SAR(1 g) = 0.111 W/kg; SAR(10 g) = 0.091 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.127 W/kg



Appendix A.26 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 12 Head

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 12_10MHz_1RB_25 Offset_QPSK_Right Touch_CH23095_Head.da53:0

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.239$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Right Touch_CH23095_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.125 W/kg

Head/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Right Touch_CH23095_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

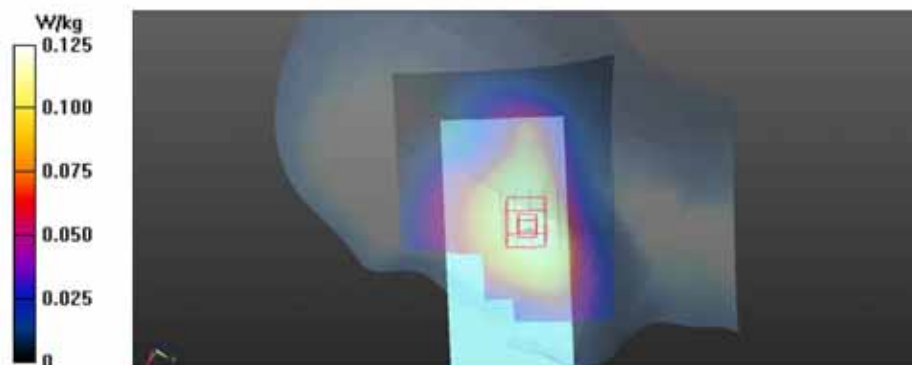
Reference Value = 7.193 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.128 W/kg

SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.088 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.121 W/kg



Appendix A.27 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 13 Head

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 13_10MHz_1RB_0 Offset_QPSK_Right Touch_CH23230_Head.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.884 \text{ S/m}$; $\epsilon_r = 41.886$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Right

Touch_CH23230_Head/Area Scan (81x101x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.196 W/kg

Head/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Right

Touch_CH23230_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.414 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.198 W/kg

SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.132 W/kg

Maximum value of SAR (measured) = 0.189 W/kg



Appendix A.28 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 14 Head

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 14_10MHz_1RB_0 Offset_QPSK_Right Touch_CH23330_Head.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 14 (0); Frequency: 793 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 793 \text{ MHz}$; $\sigma = 0.896 \text{ S/m}$; $\epsilon_r = 41.729$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.51, 9.51, 9.51); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Right

Touch_CH23330_Head/Area Scan (81x101x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.192 W/kg

Head/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Right

Touch_CH23330_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.777 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.193 W/kg

SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.126 W/kg

Maximum value of SAR (measured) = 0.183 W/kg



Appendix A.29 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 26 Head

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 26_15MHz_1RB_0 Offset_QPSK_Right Touch_CH26865_Head.da53.0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 26 (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 831.5$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 40.475$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 26_15MHz_1RB_0 Offset_QPSK_Right

Touch_CH26865_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.291 W/kg

Head/LTE Band 26_15MHz_1RB_0 Offset_QPSK_Right

Touch_CH26865_Head/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

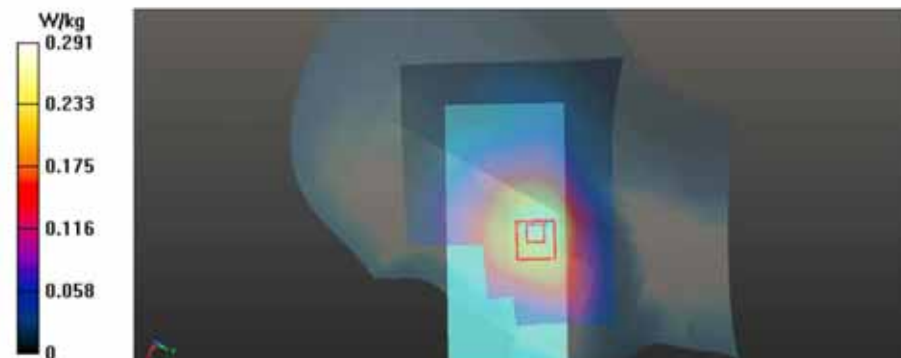
Reference Value = 5.048 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.324 W/kg

SAR(1 g) = 0.229 W/kg; SAR(10 g) = 0.162 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.249 W/kg



Appendix A.30 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 5 Head

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 5 10MHz 1RB 0 Offset QPSK Right Touch CH20525 Head da53:0

Ambient Temp : 22.8 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 40.466$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.24, 9.24, 9.24); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 5 10MHz 1RB 0 Offset QPSK Right

Touch_CH20525_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.288 W/kg

Head/LTE Band 5 10MHz 1RB 0 Offset QPSK Right

Touch_CH20525_Head/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.263 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.418 W/kg

SAR(1 g) = 0.240 W/kg; SAR(10 g) = 0.176 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.263 W/kg



Appendix A.31 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 66 Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 66_20MHz_1RB_0 Offset_QPSK_Left Touch_CH132572_Head.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 66 (0); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1770$ MHz; $\sigma = 1.426$ S/m; $\epsilon_r = 38.342$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.73, 8.73, 8.73); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 66_20MHz_1RB_0 Offset_QPSK_Left

Touch_CH132572_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.315 W/kg

Head/LTE Band 66_20MHz_1RB_0 Offset_QPSK_Left

Touch_CH132572_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.516 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.325 W/kg

SAR(1 g) = 0.209 W/kg; SAR(10 g) = 0.134 W/kg

Maximum value of SAR (measured) = 0.282 W/kg



Appendix A.32 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 25 Head

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 25_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH26140_Head.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 25 (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1860$ MHz; $\sigma = 1.344$ S/m; $\epsilon_r = 38.19$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.39, 8.39, 8.39); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 25_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH26140_Head/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.281 W/kg

Head/LTE Band 25_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH26140_Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.065 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.310 W/kg
SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.113 W/kg
Maximum value of SAR (measured) = 0.261 W/kg



Appendix A.33 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 30 Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 30_20MHz_1RB_0 Offset_QPSK_Left Touch_CH27710_Ant B.da53:0

Ambient Temp : 23.4 °C Tissue Temp : 22.1 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 30 (0); Frequency: 2310 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2310$ MHz; $\sigma = 1.689$ S/m; $\epsilon_r = 39.639$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(7.22, 7.22, 7.22); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 30_20MHz_1RB_0 Offset_QPSK_Left

Touch_CH27710_Head_Ant B/Area Scan (111x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.123 W/kg

Head/LTE Band 30_20MHz_1RB_0 Offset_QPSK_Left

Touch_CH27710_Head_Ant B/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.328 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.162 W/kg

SAR(1 g) = 0.073 W/kg; SAR(10 g) = 0.035 W/kg

Maximum value of SAR (measured) = 0.126 W/kg



Appendix A.34 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 7 Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 7 20MHz_1RB_0 Offset_QPSK_Left Touch_CH21350_Ant B.da53:0

Ambient Temp : 23.4 °C Tissue Temp : 22.1 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2560$ MHz; $\sigma = 1.965$ S/m; $\epsilon_r = 38.289$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.74, 6.74, 6.74); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 7 20MHz_1RB_0 Offset_QPSK_Left Touch_CH21350_Head_Ant B/Area Scan (111x131x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.151 W/kg

Head/LTE Band 7 20MHz_1RB_0 Offset_QPSK_Left Touch_CH21350_Head_Ant B/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 2.384 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.189 W/kg

SAR(1 g) = 0.089 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.150 W/kg



Appendix A.35 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 41 Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 41_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH40185_Head.da53:0

Ambient Temp : 23.4 °C Tissue Temp : 22.1 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.57979

Medium parameters used (interpolated): $f = 2549.5$ MHz; $\sigma = 1.952$ S/m; $\epsilon_r = 38.323$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.74, 6.74, 6.74); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/LTE Band 41_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH40185_Head/Area Scan (111x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.0980 W/kg

Head/LTE Band 41_20MHz_IRB_0_Offset_QPSK_LeftTouch_CH40185_Head/Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.201 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.124 W/kg

SAR(1 g) = 0.070 W/kg; SAR(10 g) = 0.049 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.0989 W/kg



Appendix A.36 SAR Test Plots for Cell Phone+ LED View Cover 2.4 GHz WLAN Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [WLAN_802.11b_Right Touch_CH1_Ant2.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2412 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2412$ MHz; $\sigma = 1.819$ S/m; $\epsilon_r = 38.763$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.88, 6.88, 6.88); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/WLAN_802.11b_Right Touch_CH1_Ant2/Area Scan (101x131x1): Interpolated
grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.455 W/kg

Head/WLAN_802.11b_Right Touch_CH1_Ant2/Zoom Scan (8x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.718 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.322 W/kg; SAR(10 g) = 0.146 W/kg
Maximum value of SAR (measured) = 0.563 W/kg



Appendix A.37 SAR Test Plots for Cell Phone+ LED View Cover 2.4 GHz WLAN Head MIMO

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [WLAN_802.11n_HT20_Right Touch_CH6_Head_MIMO.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.846$ S/m; $\epsilon_r = 38.678$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.88, 6.88, 6.88); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 2017-08-22
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/WLAN_802.11n_HT20_Right Touch_CH6_Head_MIMO/Area Scan (101x131x1): Interpolated
grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.605 W/kg

Head/WLAN_802.11n_HT20_Right Touch_CH6_Head_MIMO/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

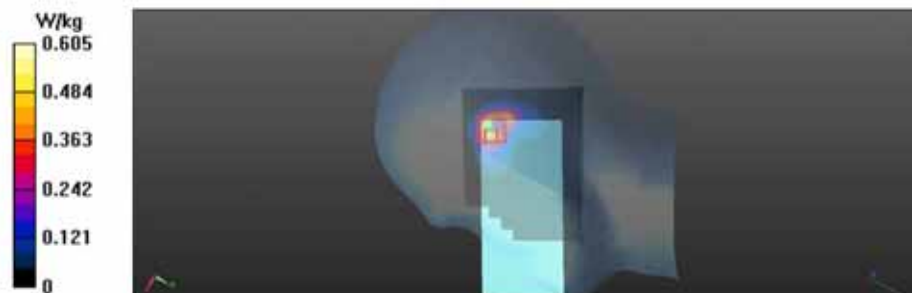
Reference Value = 11.20 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.783 W/kg

SAR(1 g) = 0.300 W/kg; SAR(10 g) = 0.132 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.596 W/kg



Appendix A.38 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2A Head

Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.3GHz_WLAN_802.11ac_VHT80_Right Touch_CH58_Ant2_Head.da53.0](#)

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5290 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5290$ MHz; $\sigma = 4.72$ S/m; $\epsilon_r = 35.19$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(5.11, 5.11, 5.11); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/5.3GHz_WLAN_802.11ac_VHT80_Right Touch_CH58_Ant2_Head/Area Scan (111x121x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.432 W/kg

Head/5.3GHz_WLAN_802.11ac_VHT80_Right Touch_CH58_Ant2_Head/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 6.671 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.657 W/kg

SAR(1 g) = 0.202 W/kg; SAR(10 g) = 0.123 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.360 W/kg



Appendix A.39 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2A Head MIMO

Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.3GHz WLAN 802.11ac_VHT80_Right Touch_CH58_MIMO_Head.da53.0](#)

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5290 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5290$ MHz; $\sigma = 4.72$ S/m; $\epsilon_r = 35.19$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(5.11, 5.11, 5.11); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/5.3GHz_WLAN_802.11ac_VHT80_Right Touch_CH58_MIMO_Head/Area Scan (101x131x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.354 W/kg

Head/5.3GHz_WLAN_802.11ac_VHT80_Right Touch_CH58_MIMO_Head/Zoom Scan (8x8x7)/Cube

0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 6.922 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.588 W/kg

SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.147 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.340 W/kg



Appendix A.40 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2C Head

Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.6GHz WLAN 802.11ac_VHT80_Right Touch_CH138_Ant2_Head.da53:0](#)

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5690 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5690$ MHz; $\sigma = 5.211$ S/m; $\epsilon_r = 34.049$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.78, 4.78, 4.78); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/5.6GHz_WLAN_802.11ac_VHT80_Right Touch_CH138_Ant2_Head/Area Scan (111x121x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.435 W/kg

Head/5.6GHz_WLAN_802.11ac_VHT80_Right Touch_CH138_Ant2_Head/Zoom Scan (8x8x7)/Cube

0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.614 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.839 W/kg

SAR(1 g) = 0.217 W/kg; SAR(10 g) = 0.141 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.401 W/kg



Appendix A.41 SAR Test Plots for Cell Phone+ LED View Cover U-NII-3 Head

Date: 2018-04-03

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: 5.8GHz_WLAN_802.11ac_VHT80_Right Touch_CH155_Ant2_Head.da53:0

Ambient Temp : 22.5 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5775 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5775$ MHz; $\sigma = 5.359$ S/m; $\epsilon_r = 34.884$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.75, 4.75, 4.75); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/5.8GHz_WLAN_802.11ac_VHT80_Right Touch_CH155_Ant2_Head/Area Scan (111x121x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.365 W/kg

Head/5.8GHz_WLAN_802.11ac_VHT80_Right Touch_CH155_Ant2_Head/Zoom Scan (8x8x7)/Cube

0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 5.936 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.726 W/kg

SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.149 W/kg

Maximum value of SAR (measured) = 0.354 W/kg



Appendix A.42 SAR Test Plots for Cell Phone+ LED View Cover Bluetooth Head

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [Bluetooth_GFSK_DH5_Right Touch_CH0.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.0 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, Bluetooth (0); Frequency: 2402 MHz; Duty Cycle: 1:1.31432
Medium parameters used (interpolated): $f = 2402$ MHz; $\sigma = 1.809$ S/m; $\epsilon_r = 38.79$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.88, 6.88, 6.88); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1507; Calibrated: 8/22/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/Bluetooth_GFSK_DH5_Right Touch_CH0/Area Scan (101x131x1): Interpolated
grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.547 W/kg

Head/Bluetooth_GFSK_DH5_Right Touch_CH0/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.619 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.753 W/kg
SAR(1 g) = 0.311 W/kg; SAR(10 g) = 0.135 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.545 W/kg



Appendix A.43 SAR Test Plots for Cell Phone+ LED View Cover CDMA BC10(\$90S) Body Worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC10_Rear_CH564_Body Worn.da53.0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA BC10 (0); Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 820.1$ MHz; $\sigma = 0.943$ S/m; $\epsilon_r = 55.593$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/CDMA BC10_Rear_CH564_Body Worn/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.368 W/kg

Body/CDMA BC10_Rear_CH564_Body Worn/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

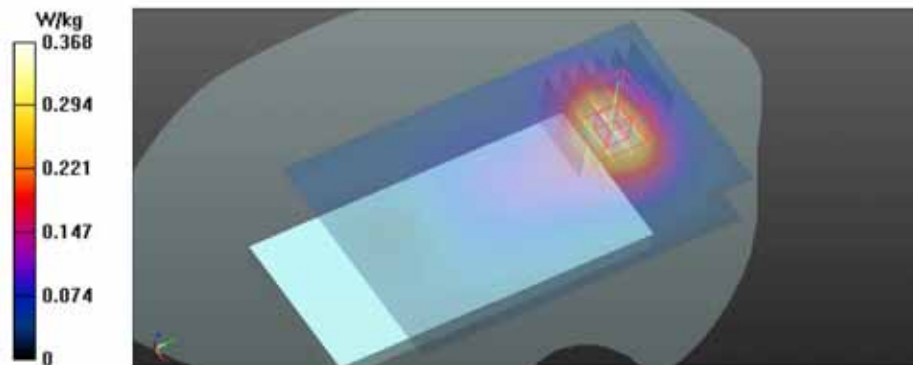
Reference Value = 8.340 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.436 W/kg

SAR(1 g) = 0.248 W/kg; SAR(10 g) = 0.141 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.367 W/kg



Appendix A.44 SAR Test Plots for Cell Phone+ LED View Cover CDMA BC0(\$22H) Body Worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC0 Rear CH384 Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA DCN (0); Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 837$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 55.447$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/CDMA BC0_Rear_CH384_Body Worn/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.285 W/kg

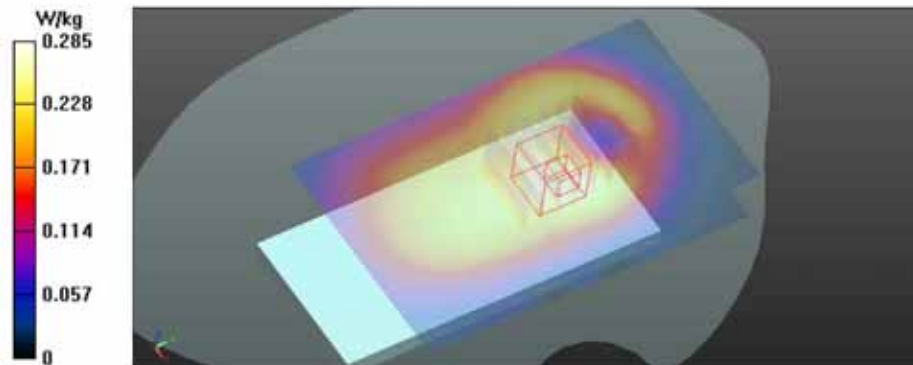
Body/CDMA BC0_Rear_CH384_Body Worn/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.84 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.302 W/kg

SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.183 W/kg

Maximum value of SAR (measured) = 0.280 W/kg



Appendix A.45 SAR Test Plots for Cell Phone+ LED View Cover PCS CDMA Body Worn

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [PCS CDMA Rear CH600 Body Worn.da53.0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, PCS CDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 54.995$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/PCS CDMA_Rear_CH600_Body Worn/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.684 W/kg

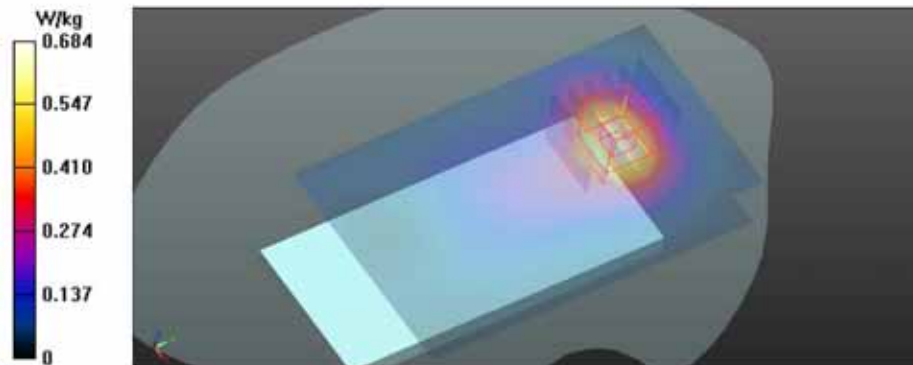
Body/PCS CDMA_Rear_CH600_Body Worn/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.878 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.768 W/kg

SAR(1 g) = 0.521 W/kg; SAR(10 g) = 0.332 W/kg

Maximum value of SAR (measured) = 0.690 W/kg



Appendix A.46 SAR Test Plots for Cell Phone+ LED View Cover GSM850 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [GPRS 850_Rear_CH190_1TX_Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

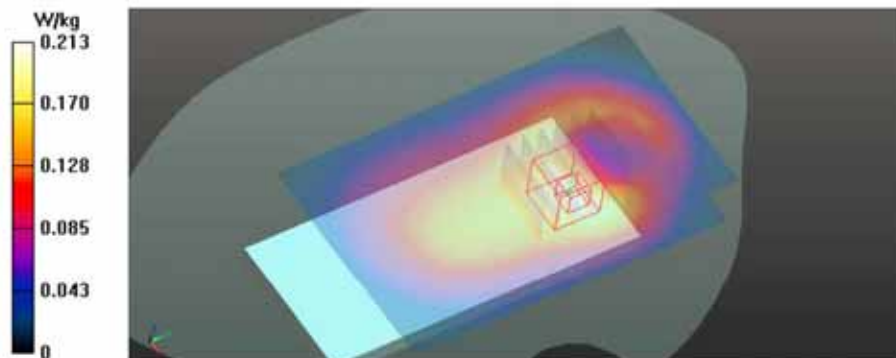
Communication System: UID 0, GPRS850 1TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 837$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 55.447$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/GPRS 850_Rear_CH190_1TX_Body Worn/Area Scan (71x111x1): Interpolated
grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.213 W/kg

Body/GPRS 850_Rear_CH190_1TX_Body Worn/Zoom Scan (5x6x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.26 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.226 W/kg
SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.128 W/kg
Maximum value of SAR (measured) = 0.210 W/kg



Appendix A.47 SAR Test Plots for Cell Phone+ LED View Cover GSM1900 Body worn

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [GPRS 1900 Rear CH661 ITX Body Worn.da53-0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, GPRS1900 ITX (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 54.995$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY 52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/GPRS 1900 Rear CH661 ITX Body Worn/Area Scan (71x111x1):

Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.328 W/kg

Body/GPRS 1900 Rear CH661 ITX Body Worn/Zoom Scan (5x6x7)/Cube 0:

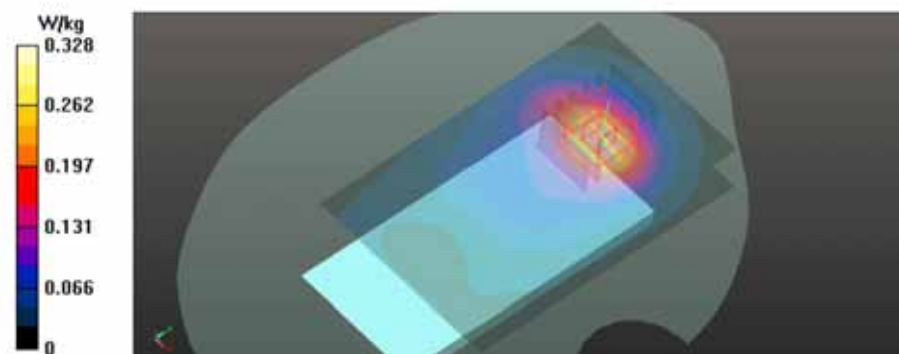
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 5.907 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.360 W/kg

SAR(1 g) = 0.253 W/kg; SAR(10 g) = 0.166 W/kg

Maximum value of SAR (measured) = 0.324 W/kg



Appendix A.48 SAR Test Plots for Cell Phone+ LED View Cover UMTS 850 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS850_Rear_CH4183_Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

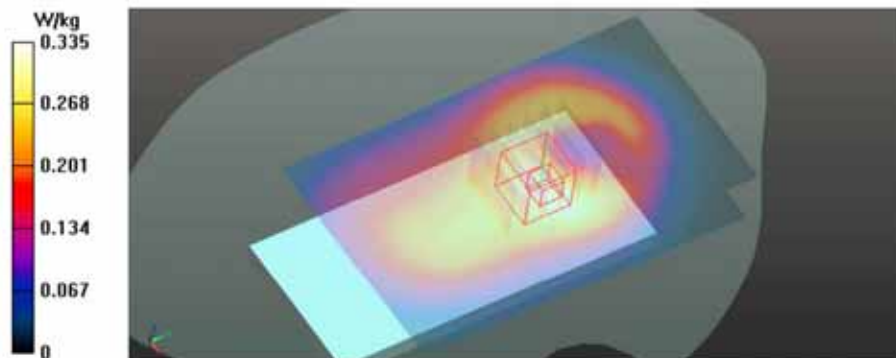
Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 837$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 55.447$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/UMTS850_Rear_CH4183_Body Worn/Area Scan (71x111x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.335 W/kg

Body/UMTS850_Rear_CH4183_Body Worn/Zoom Scan (5x6x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.51 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.370 W/kg
SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.207 W/kg
Maximum value of SAR (measured) = 0.344 W/kg



Appendix A.49 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1750 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMT1750_Rear_CHI412_Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WCDMA 4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.491$ S/m; $\epsilon_r = 51.27$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.37, 8.37, 8.37); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

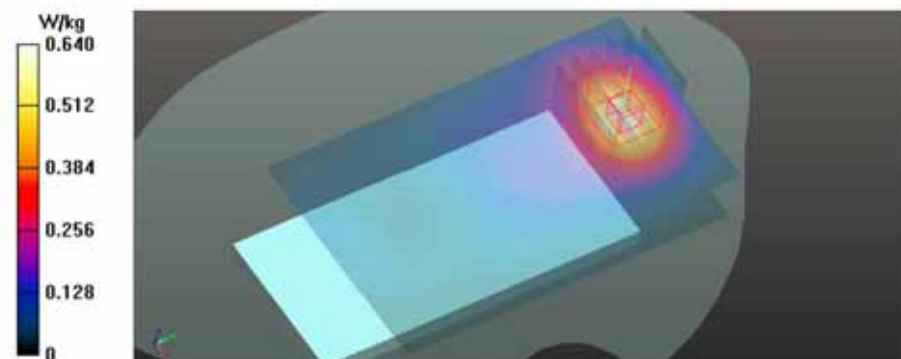
Body/UMT1750_Rear_CHI412_Body Worn/Area Scan (71x111x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.640 W/kg

Body/UMT1750_Rear_CHI412_Body Worn/Zoom Scan (5x6x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.780 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.626 W/kg
SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.290 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.565 W/kg



Appendix A.50 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1900 Body worn

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: UMTS1900_Rear_CH9400_Body Worn.da53:0

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

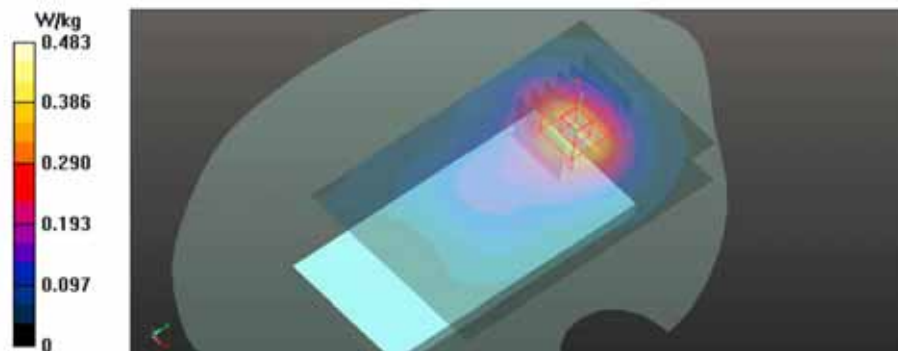
Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 54.995$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY 52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/UMTS1900_Rear_CH9400_Body Worn/Area Scan (71x111x1): Interpolated
grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.483 W/kg

Body/UMTS1900_Rear_CH9400_Body Worn/Zoom Scan (5x6x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.368 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.532 W/kg
SAR(1 g) = 0.357 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 0.476 W/kg



Appendix A.51 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 71 Body worn

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CHI33297_Body Worn.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 71 (0); Frequency: 680.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 680.5$ MHz; $\sigma = 0.931$ S/m; $\epsilon_r = 56.258$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CHI33297_Body Worn/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.235 W/kg

Body/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CHI33297_Body Worn/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

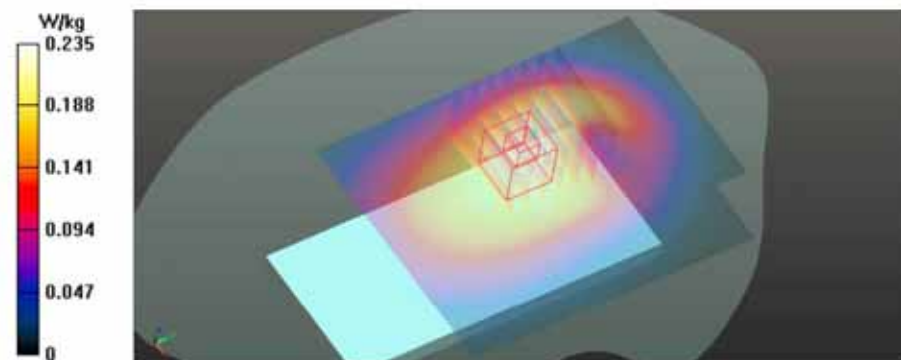
Reference Value = 13.90 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.260 W/kg

SAR(1 g) = 0.189 W/kg; SAR(10 g) = 0.144 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.234 W/kg



Appendix A.52 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 12 Body worn

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Body Worn.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.951$ S/m; $\epsilon_r = 55.985$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Body Worn/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.200 W/kg

Body/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Body Worn/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

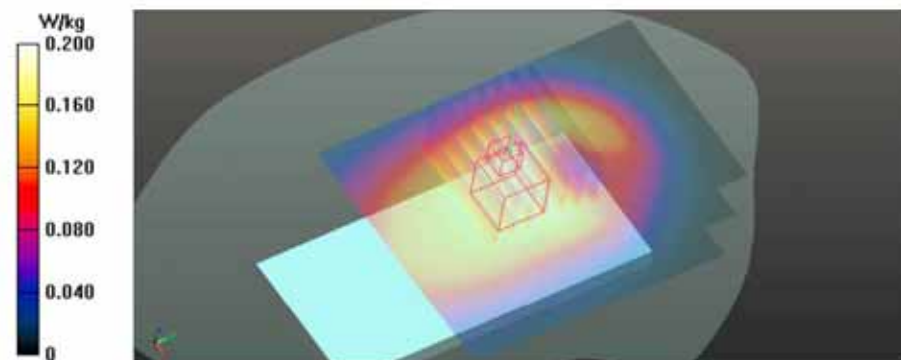
Reference Value = 13.38 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.219 W/kg

SAR(1 g) = 0.154 W/kg; SAR(10 g) = 0.121 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.195 W/kg



Appendix A.53 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 13 Body worn

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Body Worn.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.995 \text{ S/m}$; $\epsilon_r = 55.544$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;

- Sensor-Surface: 1.4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017

- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821

- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Body

Worn/Area Scan (81x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.331 W/kg

Body/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Body

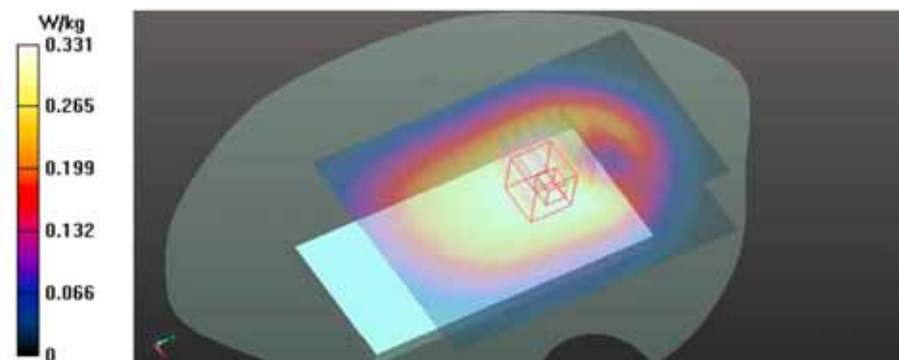
Worn/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.39 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.354 W/kg

SAR(1 g) = 0.272 W/kg; SAR(10 g) = 0.210 W/kg

Maximum value of SAR (measured) = 0.323 W/kg



Appendix A.54 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 14 Body worn

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Body Worn.da53.0

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 14 (0); Frequency: 793 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 793$ MHz; $\sigma = 1.004$ S/m; $\epsilon_r = 55.416$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Body Worn/Area Scan

(81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.357 W/kg

Body/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Body Worn/Zoom Scan

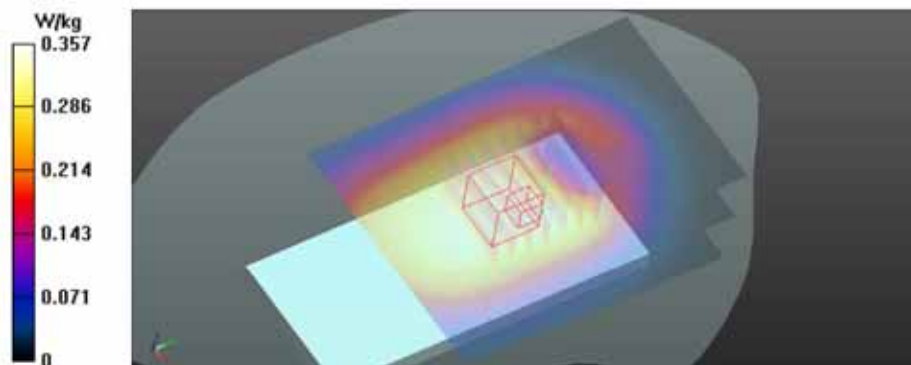
(6x7x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 19.17 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.376 W/kg

SAR(1 g) = 0.291 W/kg; SAR(10 g) = 0.226 W/kg

Maximum value of SAR (measured) = 0.345 W/kg



Appendix A.55 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 26 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 26_15MHz_1RB_74 Offset_QPSK_Rear_CH26865_Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 26 (0); Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 831.5$ MHz; $\sigma = 0.955$ S/m; $\epsilon_r = 55.493$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 26_15MHz_1RB_74 Offset_QPSK_Rear_CH26865_Body Worn/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.295 W/kg

Body/LTE Band 26_15MHz_1RB_74 Offset_QPSK_Rear_CH26865_Body Worn/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

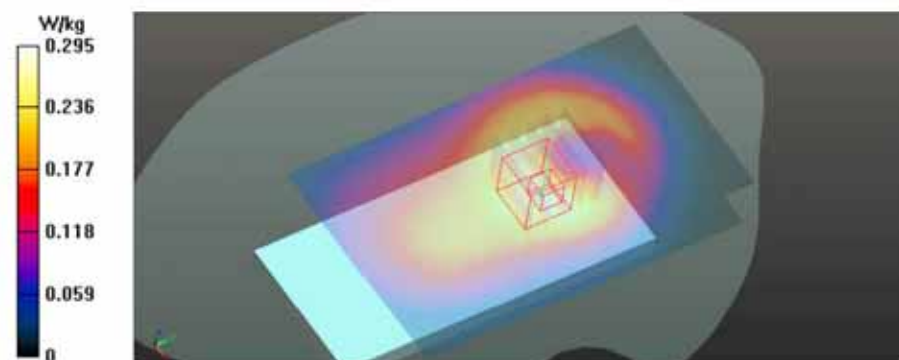
Reference Value = 14.76 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.315 W/kg

SAR(1 g) = 0.242 W/kg; SAR(10 g) = 0.177 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.292 W/kg



Appendix A.56 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 5 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Body Worn.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.959$ S/m; $\epsilon_r = 55.449$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Body Worn/Area Scan (71x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.335 W/kg

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Body Worn/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

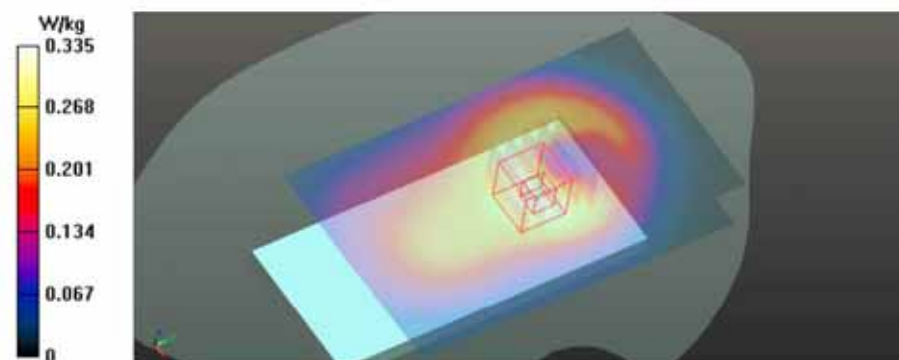
Reference Value = 15.76 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.345 W/kg

SAR(1 g) = 0.265 W/kg; SAR(10 g) = 0.195 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.320 W/kg



Appendix A.57 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 66 Body worn

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 66_20MHz_1RB_0 Offset_QPSK_Rear_CH132322.da53.0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 66 (0); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.505$ S/m; $\epsilon_r = 51.22$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

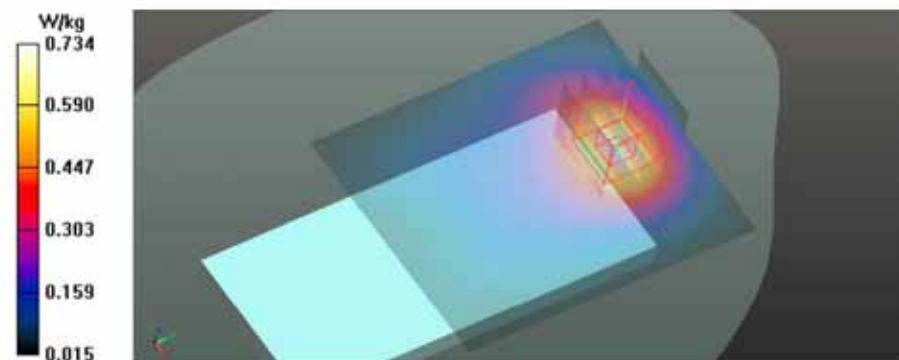
- Probe: EX3DV4 - SN3862; ConvF(8.37, 8.37, 8.37); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 66_20MHz_1RB_0 Offset_QPSK_Rear_CH132322/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.734 W/kg

Body/LTE Band 66_20MHz_1RB_0 Offset_QPSK_Rear_CH132322/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.648 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.826 W/kg
SAR(1 g) = 0.548 W/kg; SAR(10 g) = 0.342 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.736 W/kg



Appendix A.58 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 25 Body worn

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 25_20MHz_1RB_0 Offset_QPSK_Rear_CH26590_Body Worn.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 25 (0); Frequency: 1905 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 1905$ MHz; $\sigma = 1.517$ S/m; $\epsilon_r = 54.92$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 25_20MHz_1RB_0 Offset_QPSK_Rear_CH26590_Body Worn/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.600 W/kg

Body/LTE Band 25_20MHz_1RB_0 Offset_QPSK_Rear_CH26590_Body Worn/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

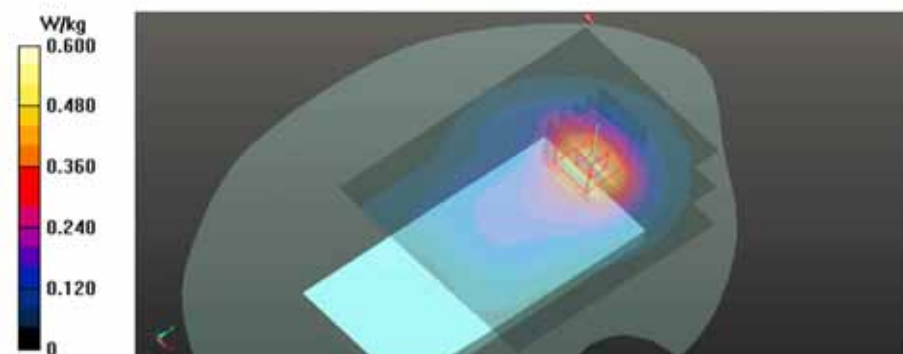
Reference Value = 10.34 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.675 W/kg

SAR(1 g) = 0.451 W/kg; SAR(10 g) = 0.282 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.604 W/kg



Appendix A.59 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 30 Body worn

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 30_10MHz_1RB_0 Offset_QPSK_Rear_CH27710_Body Worn.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 30 (0); Frequency: 2310 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2310$ MHz; $\sigma = 1.811$ S/m; $\epsilon_r = 51.899$; $\rho = 1000$ kg/m³

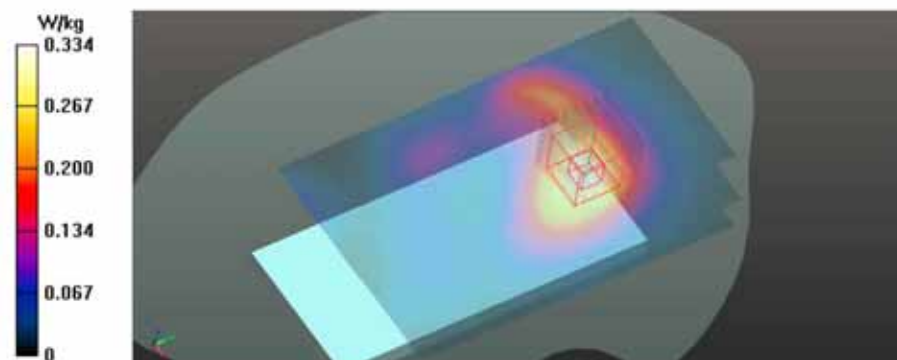
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3933; ConvF(8.26, 8.26, 8.26); Calibrated: 9/28/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 30_10MHz_1RB_0 Offset_QPSK_Rear_CH27710_Body Worn/Area Scan (111x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.334 W/kg

Body/LTE Band 30_10MHz_1RB_0 Offset_QPSK_Rear_CH27710_Body Worn/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 4.942 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.384 W/kg
SAR(1 g) = 0.243 W/kg; SAR(10 g) = 0.151 W/kg
Maximum value of SAR (measured) = 0.336 W/kg



Appendix A.60 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 7 Body worn

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 7 20MHz 1RB 99 Offset QPSK Rear CH21350 Body Worn.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.8°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2560$ MHz; $\sigma = 2.172$ S/m; $\epsilon_r = 51.857$; $\rho = 1000$ kg/m³

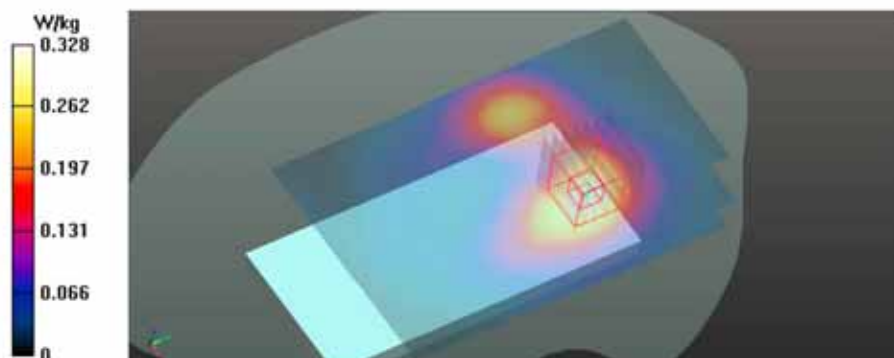
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.51, 7.51, 7.51); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 7 20MHz 1RB 99 Offset QPSK Rear CH21350 Body Worn/Area Scan (111x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.328 W/kg

Body/LTE Band 7 20MHz 1RB 99 Offset QPSK Rear CH21350 Body Worn/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 4.094 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.380 W/kg
SAR(1 g) = 0.235 W/kg; SAR(10 g) = 0.136 W/kg
Maximum value of SAR (measured) = 0.328 W/kg



Appendix A.61 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 41 Body worn

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40185_Body Worn.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.8 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.57979

Medium parameters used (interpolated): $f = 2549.5$ MHz; $\sigma = 2.157$ S/m; $\epsilon_r = 51.877$; $\rho = 1000$

kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.51, 7.51, 7.51); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40185_Body Worn/Area Scan (111x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.391 W/kg

Body/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40185_Body Worn/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

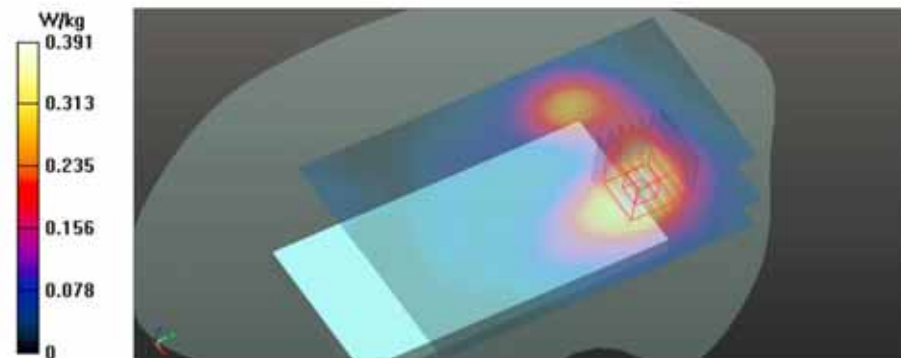
Reference Value = 4.831 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.450 W/kg

SAR(1 g) = 0.261 W/kg; SAR(10 g) = 0.154 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.379 W/kg



Appendix A.62 SAR Test Plots for Cell Phone+ LED View Cover 2.4 GHz WLAN Body worn

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: 2.45GHz_WLAN_802.11b_Rear_CH11_Ant1_Body Worn da53-0

Ambient Temp : 23.1 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.95$ S/m; $\epsilon_r = 50.801$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/2.45GHz_WLAN_802.11b_Rear_CH11_Ant1_Body Worn/Area Scan (121x91x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.134 W/kg

Body/2.45GHz_WLAN_802.11b_Rear_CH11_Ant1_Body Worn/Zoom Scan (7x7x7)/Cube 0:

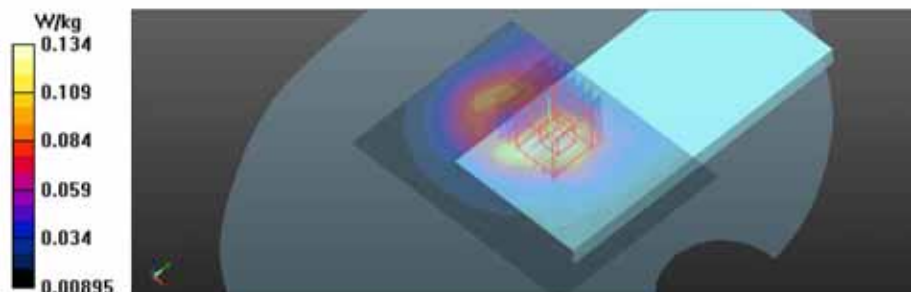
Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.878 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.155 W/kg

SAR(1 g) = 0.087 W/kg; SAR(10 g) = 0.054 W/kg

Maximum value of SAR (measured) = 0.128 W/kg



Appendix A.63 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2A Body worn

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: 5.3GHz WLAN 802.11a Rear_CH64_Ant2_Body Worn.da53.0

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.506$ S/m; $\epsilon_r = 47.908$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.37, 4.37, 4.37); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.3GHz WLAN 802.11a Rear_CH64_Ant2_Body Worn/Area Scan (121x91x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.462 W/kg

Body/5.3GHz WLAN 802.11a Rear_CH64_Ant2_Body Worn/Zoom Scan (8x8x7)/Cube 0:

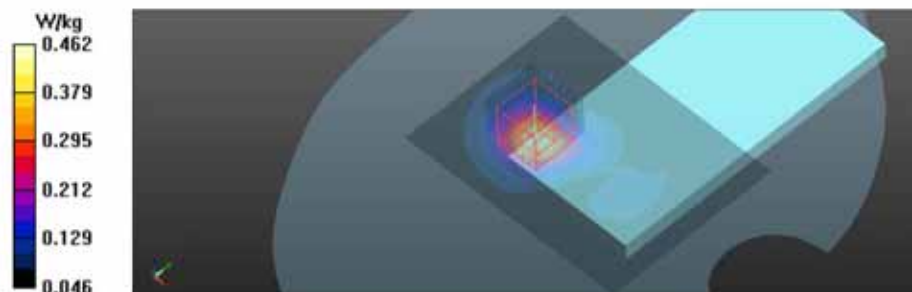
Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 5.354 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.620 W/kg

SAR(1 g) = 0.246 W/kg; SAR(10 g) = 0.130 W/kg

Maximum value of SAR (measured) = 0.450 W/kg



Appendix A.64 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2C Body worn

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.5GHz WLAN 802.11a Rear_CH120_Ant2_Body Worn.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.675$ S/m; $\epsilon_r = 47.146$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(3.9, 3.9, 3.9); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.5GHz WLAN 802.11a Rear_CH120_Ant2_Body Worn/Area Scan (121x91x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.938 W/kg

Body/5.5GHz WLAN 802.11a Rear_CH120_Ant2_Body Worn/Zoom Scan (8x8x7)/Cube 0:

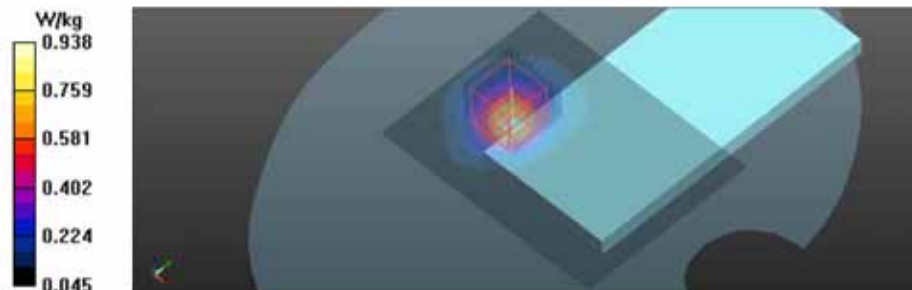
Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 4.387 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.200 W/kg

Maximum value of SAR (measured) = 0.901 W/kg



Appendix A.65 SAR Test Plots for Cell Phone+ LED View Cover U-NII-2C Body worn MIMO

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.6GHz_WLAN_802.11ac_VHT80_Rear_CH122_MIMO_Body Worn.da53:0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.6 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5610 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5610$ MHz; $\sigma = 5.89$ S/m; $\epsilon_r = 46.466$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(3.9, 3.9, 3.9); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.6GHz_WLAN_802.11ac_VHT80_Rear_CH122_MIMO/Area Scan (121x101x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.892 W/kg

Body/5.6GHz_WLAN_802.11ac_VHT80_Rear_CH122_MIMO/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

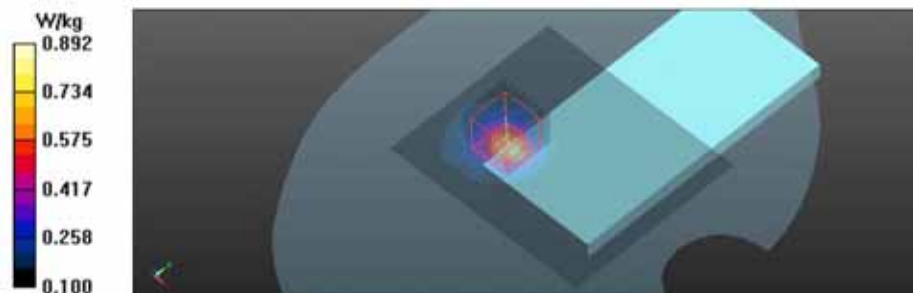
Reference Value = 5.332 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.450 W/kg; SAR(10 g) = 0.240 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.851 W/kg



Appendix A.66 SAR Test Plots for Cell Phone+ LED View Cover U-NII-3 Body worn

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.8GHz WLAN 802.11a Rear_CH165_Ant2_Body Worn.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used (extrapolated): $f = 5825 \text{ MHz}$; $\sigma = 6.162 \text{ S/m}$; $\epsilon_r = 46.341$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.09, 4.09, 4.09); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Body Worn/Area Scan (121x91x1): Interpolated grid:
 $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.548 W/kg

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Body Worn/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

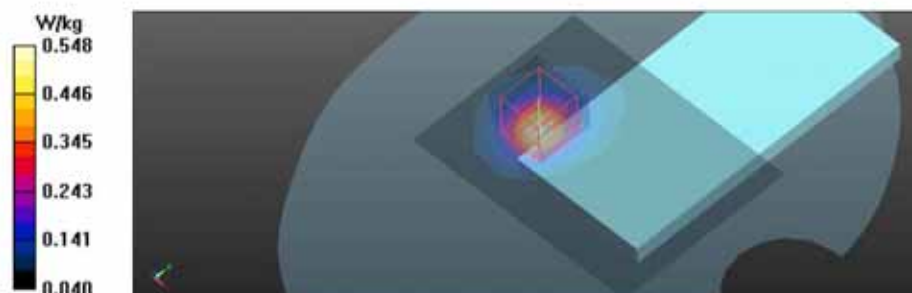
Reference Value = 3.921 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.816 W/kg

SAR(1 g) = 0.261 W/kg; SAR(10 g) = 0.130 W/kg

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.530 W/kg



Appendix A.67 SAR Test Plots for Cell Phone+ LED View Cover Bluetooth Body worn

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [Bluetooth_GFSK_DH5_Rear_CH0_Body Wron.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.7°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, Bluetooth 3.0 (0); Frequency: 2402 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2402$ MHz; $\sigma = 1.875$ S/m; $\epsilon_r = 50.926$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

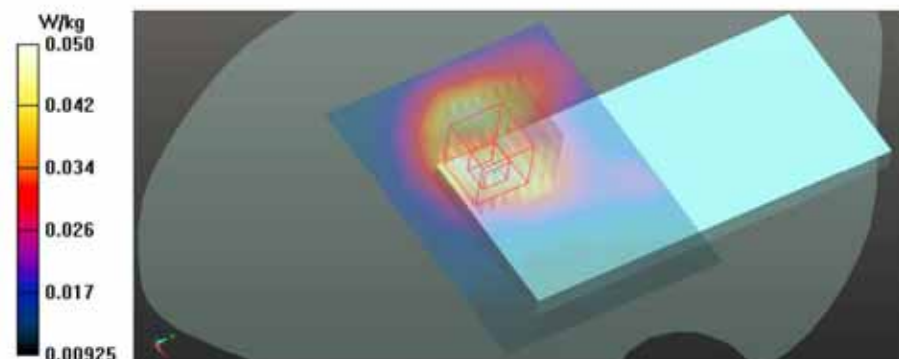
- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/Bluetooth_GFSK_DH5_Rear_CH0_Body Wron/Area Scan (121x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0502 W/kg

Body/Bluetooth_GFSK_DH5_Rear_CH0_Body Wron/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.696 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.0540 W/kg
SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.027 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0481 W/kg



Appendix A.68 SAR Test Plots for Cell Phone+ LED View Cover CDMA/EVDO BC10(\$90S) Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC10_Rear_CH564_Hotspot.da53-0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA BC10 (0); Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 820.1$ MHz; $\sigma = 0.943$ S/m; $\epsilon_r = 55.593$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/CDMA BC10_Rear_CH564_Hotspot/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.656 W/kg

Body/CDMA BC10_Rear_CH564_Hotspot/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

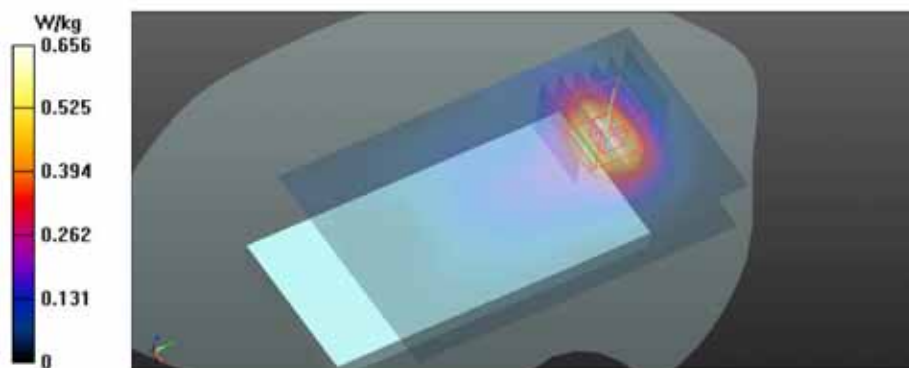
Reference Value = 9.990 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.700 W/kg

SAR(1 g) = 0.385 W/kg; SAR(10 g) = 0.210 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.583 W/kg



Appendix A.69 SAR Test Plots for Cell Phone+ LED View Cover CDMA/EVDO BC0(§22H) Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA BC0 Rear CH384 Hotspot.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, CDMA DCN (0); Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 837$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 55.447$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/CDMA BC0_Rear_CH384_Hotspot/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.632 W/kg

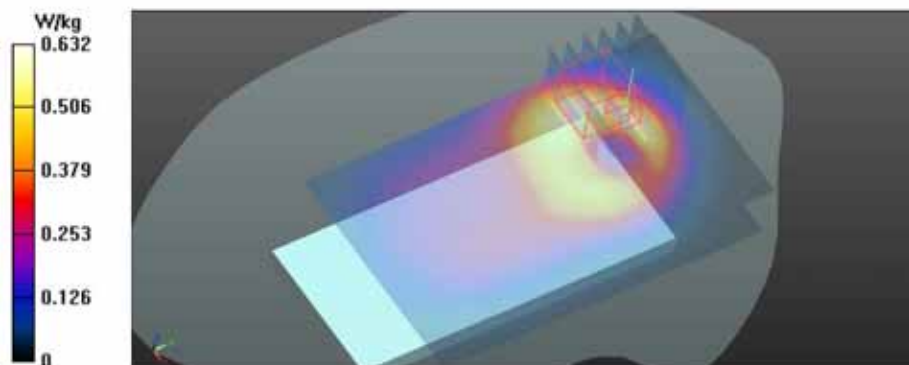
Body/CDMA BC0_Rear_CH384_Hotspot/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.81 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.755 W/kg

SAR(1 g) = 0.456 W/kg; SAR(10 g) = 0.274 W/kg

Maximum value of SAR (measured) = 0.634 W/kg



Appendix A.70 SAR Test Plots for Cell Phone+ LED View Cover PCS CDMA/EVDO Hotspot

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [PCS CDMA_Bottom_CH600_Hotspot.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

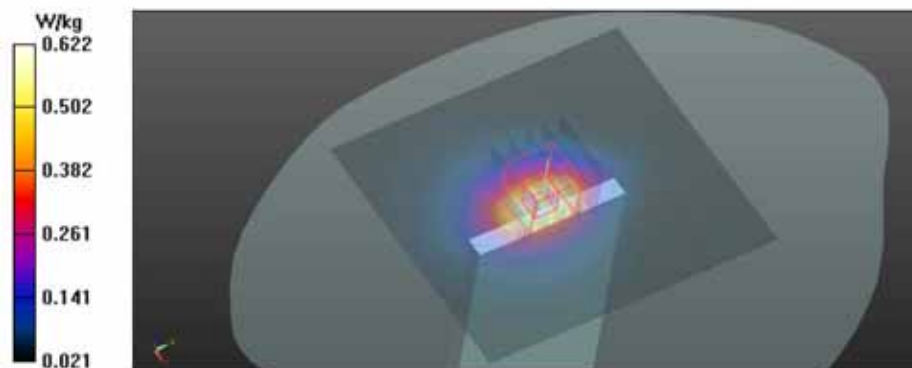
Communication System: UID 0, PCS CDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 54.995$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/PCS CDMA_Bottom_CH600_Hotspot/Area Scan (81x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.622 W/kg

Body/PCS CDMA_Bottom_CH600_Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.491 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.687 W/kg
SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.295 W/kg
Maximum value of SAR (measured) = 0.623 W/kg



Appendix A.71 SAR Test Plots for Cell Phone+ LED View Cover GSM850 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [GPRS 850_Rear_CH190_4TX_Hotspot.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

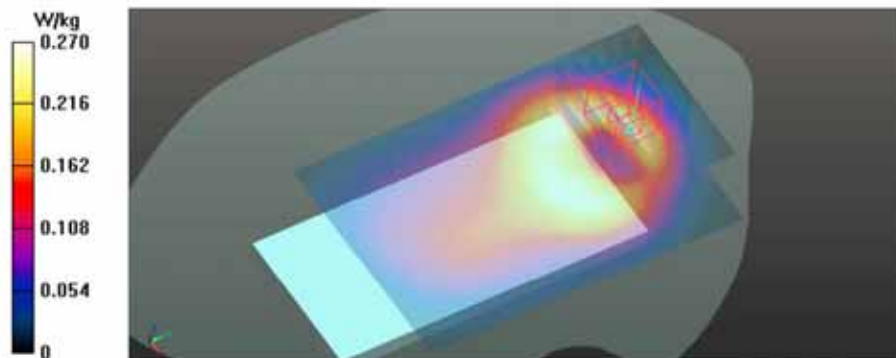
Communication System: UID 0, GPRS850 4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07491
Medium parameters used: $f = 837$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 55.447$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/GPRS 850_Rear_CH190_4TX_Hotspot/Area Scan (71x111x1): Interpolated grid:
 $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.270 W/kg

Body/GPRS 850_Rear_CH190_4TX_Hotspot/Zoom Scan (6x6x7)/Cube 0:
Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 13.56 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.396 W/kg
SAR(1 g) = 0.249 W/kg; SAR(10 g) = 0.150 W/kg
Maximum value of SAR (measured) = 0.340 W/kg



Appendix A.72 SAR Test Plots for Cell Phone+ LED View Cover GSM1900 Hotspot

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [GPRS 1900_Bottom_CH810_4TX_Hotspot.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, GPRS1900 4TX (0); Frequency: 1909.8 MHz; Duty Cycle: 1:2.07491

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.522$ S/m; $\epsilon_r = 54.905$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

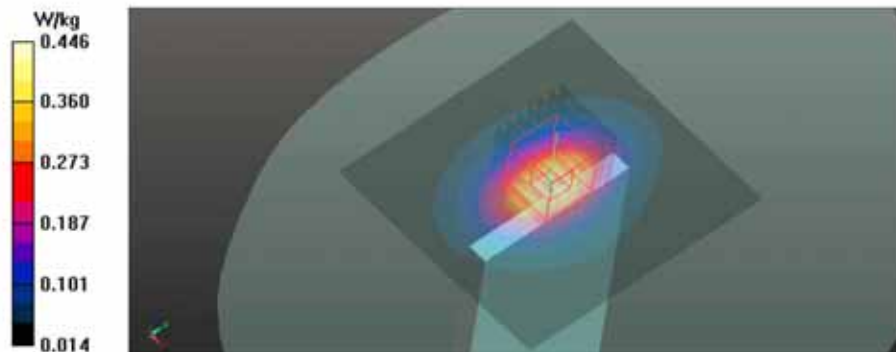
- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/GPRS 1900_Bottom_CH810_4TX_Hotspot/Area Scan (101x111x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.446 W/kg

Body/GPRS 1900_Bottom_CH810_4TX_Hotspot/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
Reference Value = 7.222 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.336 W/kg; SAR(10 g) = 0.209 W/kg
Maximum value of SAR (measured) = 0.438 W/kg



Appendix A.73 SAR Test Plots for Cell Phone+ LED View Cover UMTS 850 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS850_Rear_CH4233_Hotspot.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

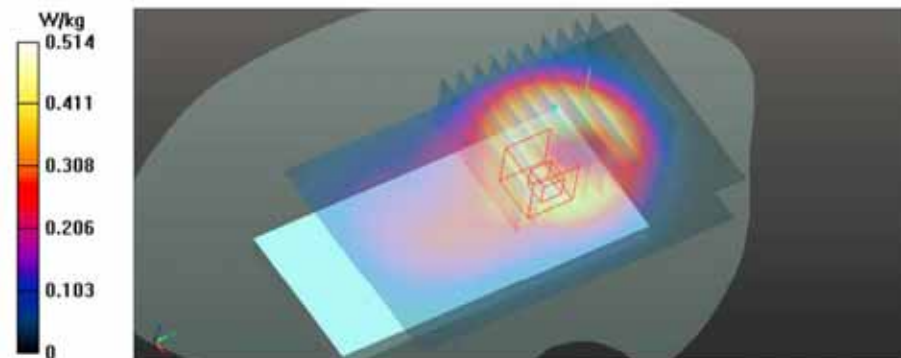
Communication System: UID 0, WCDMA5 (0); Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 847$ MHz; $\sigma = 0.969$ S/m; $\epsilon_r = 55.368$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/UMTS850_Rear_CH4233_Hotspot/Area Scan (71x111x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.514 W/kg

Body/UMTS850_Rear_CH4233_Hotspot/Zoom Scan (9x10x7)/Cube 0: Measurement
grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.20 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.623 W/kg
SAR(1 g) = 0.390 W/kg; SAR(10 g) = 0.274 W/kg
Maximum value of SAR (measured) = 0.526 W/kg



Appendix A.74 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1750 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMT1750_Rear_CH1513_Hotspot.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

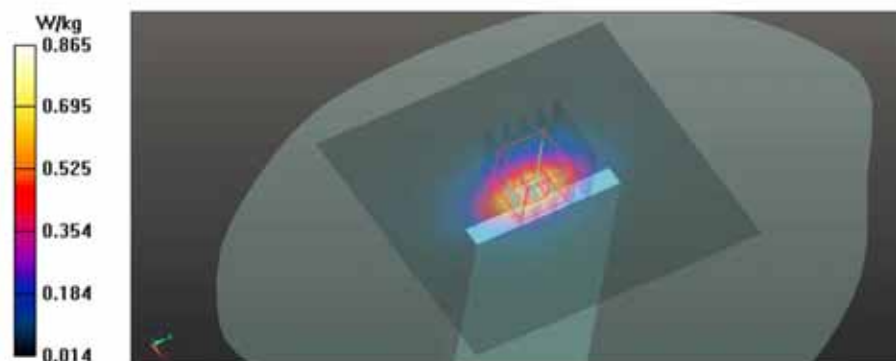
Communication System: UID 0, WCDMA 4 (0); Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1753$ MHz; $\sigma = 1.514$ S/m; $\epsilon_r = 51.192$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.37, 8.37, 8.37); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/UMTS1750_Bottom_CH1513_Hotspot/Area Scan (81x91x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.865 W/kg

Body/UMTS1750_Bottom_CH1513_Hotspot/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.804 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.922 W/kg
SAR(1 g) = 0.609 W/kg; SAR(10 g) = 0.355 W/kg
Maximum value of SAR (measured) = 0.828 W/kg



Appendix A.75 SAR Test Plots for Cell Phone+ LED View Cover UMTS 1900 Hotspot

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS1900_Bottom_CH9400_Hotspot.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

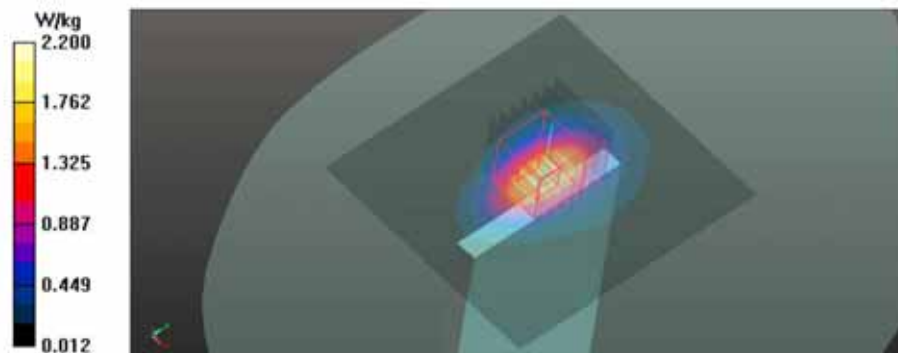
Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 54.995$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/UMTS1900_Bottom_CH9400_Hotspot/Area Scan (101x111x1): Interpolated
grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.20 W/kg

Body/UMTS1900_Bottom_CH9400_Hotspot/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.37 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.369 W/kg
Maximum value of SAR (measured) = 0.909 W/kg



Appendix A.76 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 71 Hotspot

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CH133297_Hotspot.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 71 (0); Frequency: 680.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 680.5$ MHz; $\sigma = 0.931$ S/m; $\epsilon_r = 56.258$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CH133297_Hotspot/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.353 W/kg

Body/LTE Band 71_20MHz_1RB_0 Offset_QPSK_Rear_CH133297_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

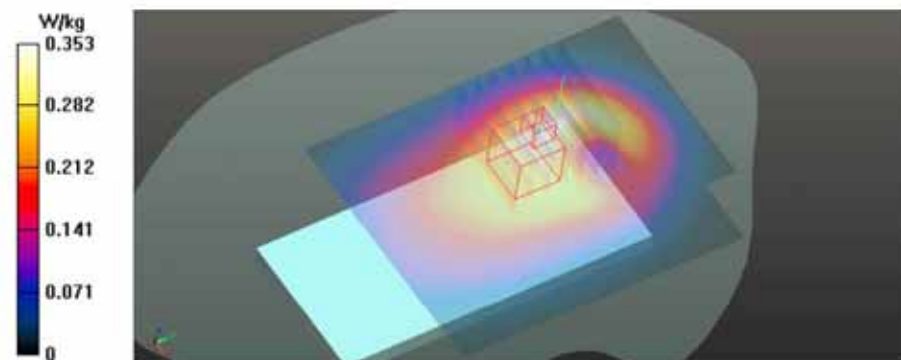
Reference Value = 15.13 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.408 W/kg

SAR(1 g) = 0.265 W/kg; SAR(10 g) = 0.190 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.354 W/kg



Appendix A.77 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 12 Hotspot

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Hotspot.da53:0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.951$ S/m; $\epsilon_r = 55.985$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Hotspot/Area Scan (81x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.335 W/kg

Body/LTE Band 12_10MHz_1RB_25 Offset_QPSK_Rear_CH23095_Hotspot/Zoom Scan (10x10x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

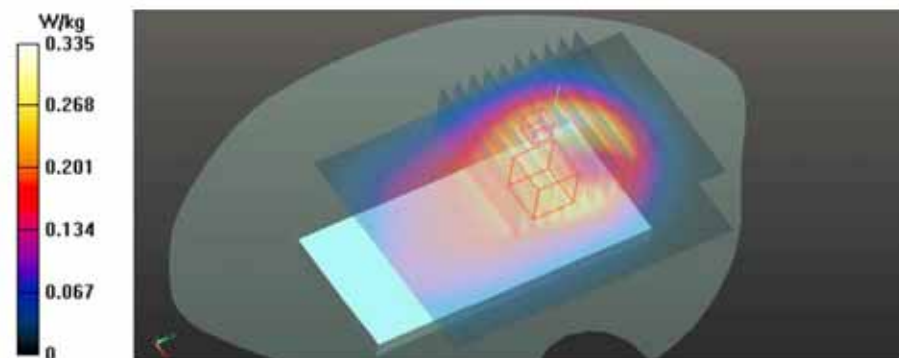
Reference Value = 14.46 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.379 W/kg

SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.165 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.325 W/kg



Appendix A.78 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 13 Hotspot

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Hotspot.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.995 \text{ S/m}$; $\epsilon_r = 55.544$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;

- Sensor-Surface: 1.4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017

- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821

- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Hotspot/Area

Scan (81x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.467 W/kg

Body/LTE Band 13_10MHz_1RB_0 Offset_QPSK_Rear_CH23230_Hotspot/Zoom

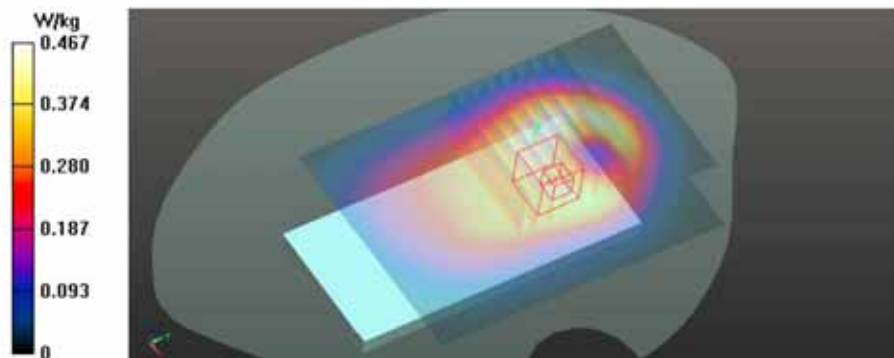
Scan (9x8x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.68 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.532 W/kg

SAR(1 g) = 0.359 W/kg; SAR(10 g) = 0.265 W/kg

Maximum value of SAR (measured) = 0.460 W/kg



Appendix A.79 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 14 Hotspot

Date: 2018-03-31

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Hotspot.da53.0

Ambient Temp : 23.4 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 14 (0); Frequency: 793 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 793$ MHz; $\sigma = 1.004$ S/m; $\epsilon_r = 55.416$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(9.19, 9.19, 9.19); Calibrated: 5/31/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1821 (20deg probe tilt); Type: QD000P40CD; Serial: TP:1821
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Hotspot/Area Scan (81x101x1):

Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.482 W/kg

Body/LTE Band 14_10MHz_1RB_0 Offset_QPSK_Rear_CH23330_Hotspot/Zoom Scan

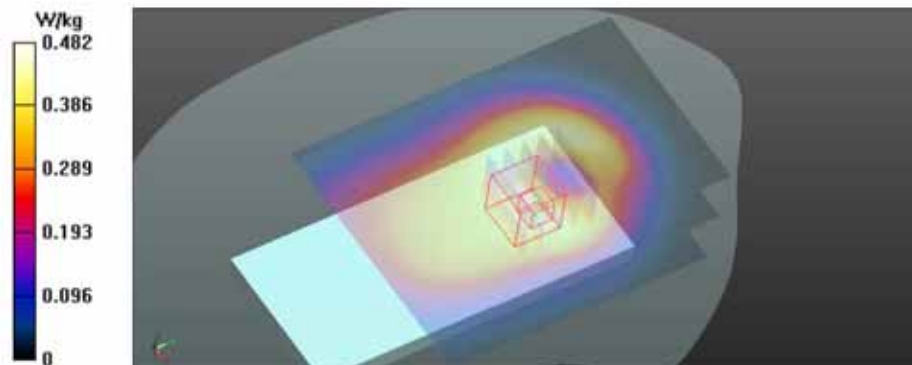
(5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 18.94 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.514 W/kg

SAR(1 g) = 0.385 W/kg; SAR(10 g) = 0.283 W/kg

Maximum value of SAR (measured) = 0.467 W/kg



Appendix A.80 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 26 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [LTE Band 26 15MHz 1RB 74 Offset QPSK Rear CH26865 Hotspot.da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 26 (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 831.5$ MHz; $\sigma = 0.955$ S/m; $\epsilon_r = 55.493$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

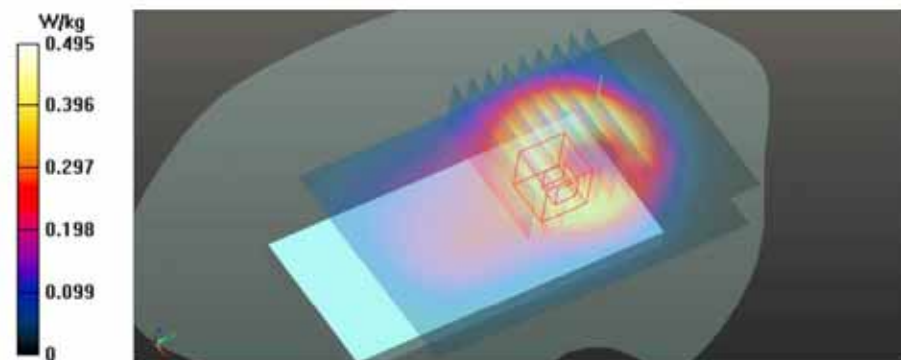
- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 26 15MHz 1RB 74 Offset QPSK Rear CH26865 Hotspot/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.495 W/kg

Body/LTE Band 26 15MHz 1RB 74 Offset QPSK Rear CH26865 Hotspot/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.79 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.571 W/kg
SAR(1 g) = 0.376 W/kg; SAR(10 g) = 0.264 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.481 W/kg



Appendix A.81 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 5 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Hotspot.da53.0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.959$ S/m; $\epsilon_r = 55.449$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

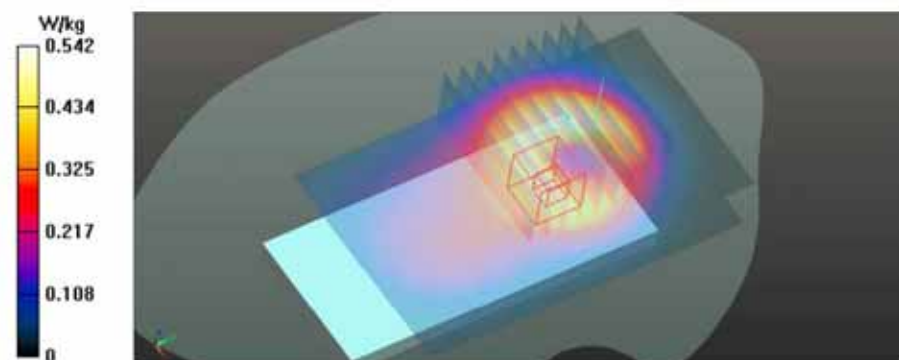
- Probe: EX3DV4 - SN3862; ConvF(9.83, 9.83, 9.83); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Hotspot/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.542 W/kg

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Rear_CH20525_Hotspot/Zoom Scan (10x9x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.67 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.601 W/kg
SAR(1 g) = 0.394 W/kg; SAR(10 g) = 0.279 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.528 W/kg



Appendix A.82 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 66 Hotspot

Date: 2018-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 66_20MHz_50RB_0 Offset_QPSK_Bottom_CH132572_Hotspot da53:0](#)

Ambient Temp : 22.9 °C Tissue Temp : 21.7 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 66 (0); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1770$ MHz; $\sigma = 1.534$ S/m; $\epsilon_r = 51.139$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.37, 8.37, 8.37); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 66_20MHz_50RB_0 Offset_QPSK_Bottom_CH132572_Hotspot/Area Scan

(61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.946 W/kg

Body/LTE Band 66_20MHz_50RB_0 Offset_QPSK_Bottom_CH132572_Hotspot/Zoom Scan

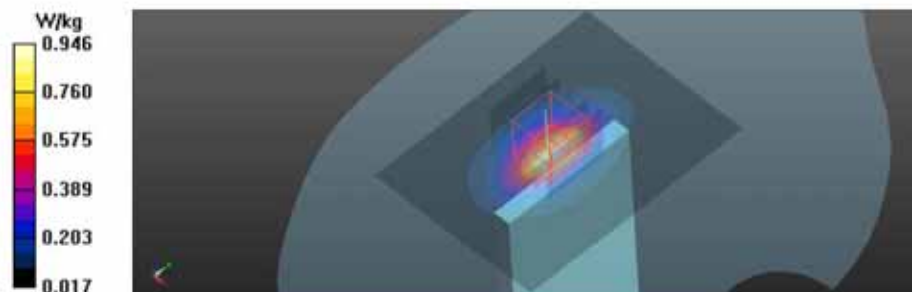
(5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.967 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.672 W/kg; SAR(10 g) = 0.389 W/kg

Maximum value of SAR (measured) = 0.908 W/kg



Appendix A.83 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 25 Hotspot

Date: 2018-04-01

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 25_20MHz_1RB_0_Offset_QPSK_Bottom_CH26590_Hotspot.da53:0](#)

Ambient Temp : 23.7 °C Tissue Temp : 21.9 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 25 (0); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1905$ MHz; $\sigma = 1.517$ S/m; $\epsilon_r = 54.92$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(8.1, 8.1, 8.1); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1843 (20deg probe tilt); Type: QD000P40CD; Serial: TP1843
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 25_20MHz_1RB_0

Offset_QPSK_Bottom_CH26590_Hotspot/Area Scan (101x111x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.01 W/kg

Body/LTE Band 25_20MHz_1RB_0

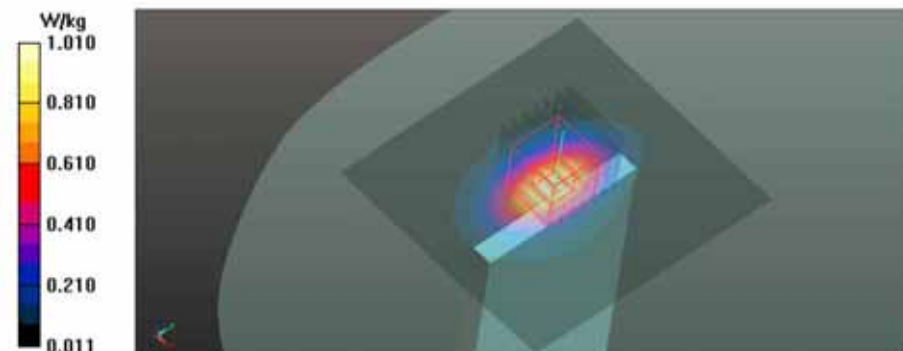
Offset_QPSK_Bottom_CH26590_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.028 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.678 W/kg; SAR(10 g) = 0.381 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.946 W/kg



Appendix A.84 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 30 Hotspot

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 30_10MHz_1RB_0_Offset_QPSK_Bottom_CH27710_Hotspot.da53.0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.7°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 30 (0); Frequency: 2310 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2310$ MHz; $\sigma = 1.811$ S/m; $\epsilon_r = 51.899$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3933; ConvF(8.26, 8.26, 8.26); Calibrated: 9/28/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 30_10MHz_1RB_0

Offset_QPSK_Bottom_CH27710_Hotspot/Area Scan (101x111x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.705 W/kg

Body/LTE Band 30_10MHz_1RB_0

Offset_QPSK_Bottom_CH27710_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement

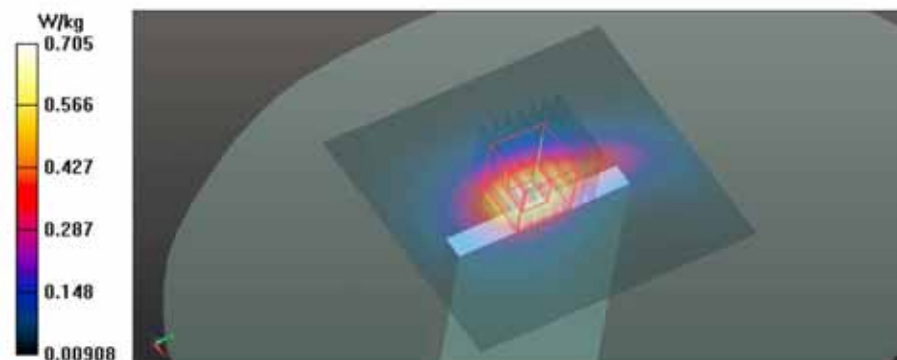
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 6.548 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.639 W/kg

SAR(1 g) = 0.375 W/kg; SAR(10 g) = 0.209 W/kg

Maximum value of SAR (measured) = 0.543 W/kg



Appendix A.85 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 7 Hotspot

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [LTE Band 7_20MHz_50RB_25_Offset_QPSK_Bottom_CH21350_Hotspot.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.8°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2560$ MHz; $\sigma = 2.172$ S/m; $\epsilon_r = 51.857$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.51, 7.51, 7.51); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 7_20MHz_50RB_25

Offset_QPSK_Bottom_CH21350_Hotspot/Area Scan (101x111x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.876 W/kg

Body/LTE Band 7_20MHz_50RB_25

Offset_QPSK_Bottom_CH21350_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement

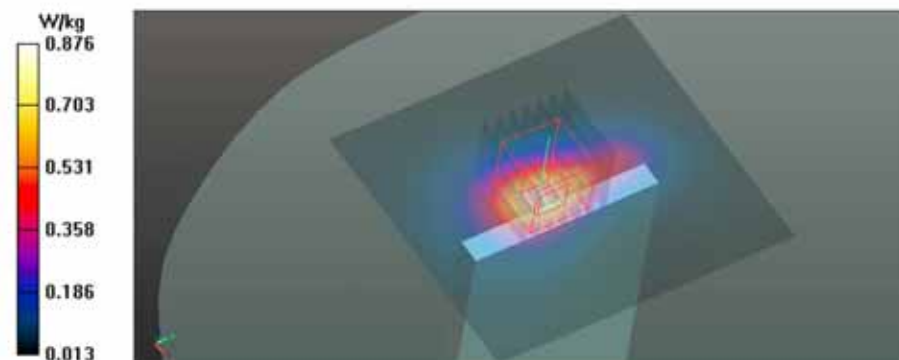
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.064 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.557 W/kg; SAR(10 g) = 0.287 W/kg

Maximum value of SAR (measured) = 0.849 W/kg



Appendix A.86 SAR Test Plots for Cell Phone+ LED View Cover LTE Band 41 Hotspot

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [LTE Band 41_20MHz_PCC_CH40185_1RB_0_QPSK_Bottom_Hotspot.da53:0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.8°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.57979
Medium parameters used (interpolated): $f = 2549.5$ MHz; $\sigma = 2.157$ S/m; $\epsilon_r = 51.877$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.51, 7.51, 7.51); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/LTE Band 41_20MHz_PCC_CH40185_1RB_0_SCC_CH39987_1RB_99 Off_QPSK_Bottom_Hotspot/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.870 W/kg

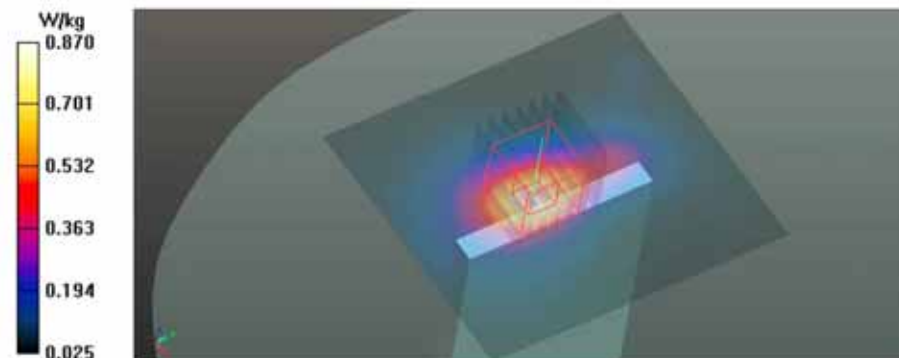
Body/LTE Band 41_20MHz_PCC_CH40185_1RB_0_SCC_CH39987_1RB_99 Off_QPSK_Bottom_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.180 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.569 W/kg; SAR(10 g) = 0.304 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.854 W/kg



Appendix A.87 SAR Test Plots for Cell Phone+ LED View Cover 2.4 GHz WLAN Hotspot

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [2.45GHz_WLAN_802.11b_Top_CH1_Ant2_Hotspot.da53.0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.7°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2412 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2412$ MHz; $\sigma = 1.888$ S/m; $\epsilon_r = 50.909$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/2.45GHz_WLAN_802.11b_Top_CH1_Ant2_Hotspot/Area Scan (101x111x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.338 W/kg

Body/2.45GHz_WLAN_802.11b_Top_CH1_Ant2_Hotspot/Zoom Scan

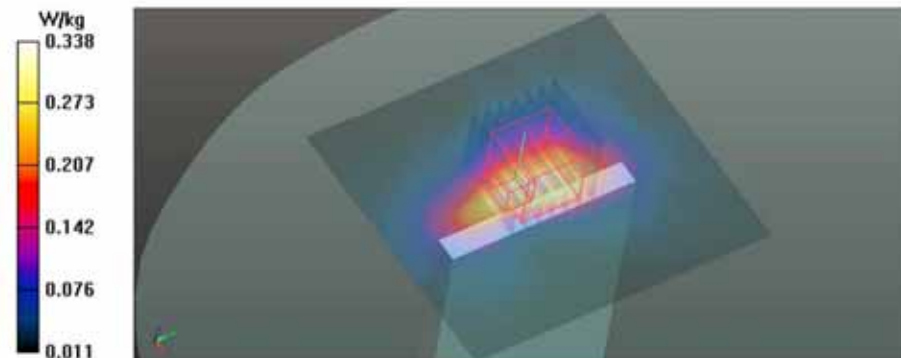
(7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.370 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.372 W/kg

SAR(1 g) = 0.217 W/kg; SAR(10 g) = 0.125 W/kg

Maximum value of SAR (measured) = 0.328 W/kg



Appendix A.88 SAR Test Plots for Cell Phone+ LED View Cover 2.4 GHz WLAN Hotspot

Date: 2018-04-02

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [2.45GHz WLAN 802.11b Top CH11_Ant1_Hotspot.da53-0](#)

Ambient Temp : 22.8 °C Tissue Temp : 21.4 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2462$ MHz; $\sigma = 2.006$ S/m; $\epsilon_r = 50.41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/2.45GHz WLAN 802.11b Top CH11_Ant1_Hotspot/Area Scan (61x111x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.166 W/kg

Body/2.45GHz WLAN 802.11b Top CH11_Ant1_Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement

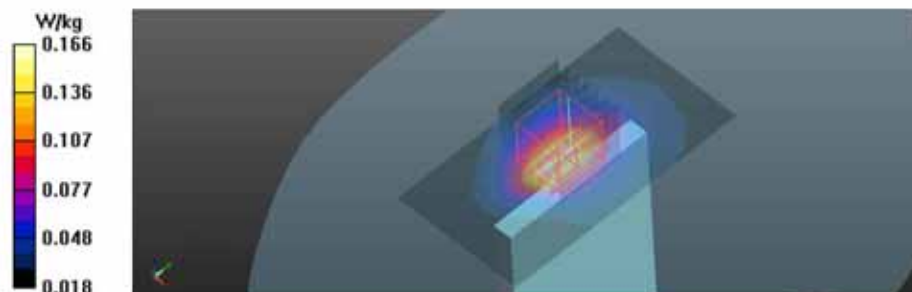
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.439 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.192 W/kg

SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.067 W/kg

Maximum value of SAR (measured) = 0.155 W/kg



Appendix A.89 SAR Test Plots for Cell Phone+ LED View Cover U-NII-3 Hotspot

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: 5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot.da53.0

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used (extrapolated): $f = 5825$ MHz; $\sigma = 6.162$ S/m; $\epsilon_r = 46.341$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.09, 4.09, 4.09); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot/Area Scan (121x91x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.823 W/kg

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot/Zoom Scan (9x9x7)/Cube 0: Measurement
grid: dx=4mm, dy=4mm, dz=1.4mm

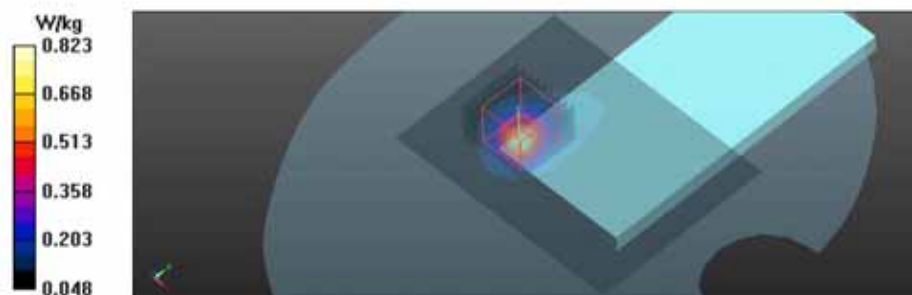
Reference Value = 4.478 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.351 W/kg; SAR(10 g) = 0.158 W/kg

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.746 W/kg



Appendix A.90 SAR Test Plots for Cell Phone+ LED View Cover U-NII-3 MIMO

Date: 2018-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot.da53.0](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.3 °C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used (extrapolated): $f = 5825$ MHz; $\sigma = 6.162$ S/m; $\epsilon_r = 46.341$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(4.09, 4.09, 4.09); Calibrated: 2017-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2017-05-23
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot/Area Scan (121x91x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.51 W/kg

Body/5.8GHz WLAN 802.11a Rear_CH165_Ant2_Hotspot/Zoom Scan (8x8x7)/Cube 0: Measurement
grid: dx=4mm, dy=4mm, dz=1.4mm

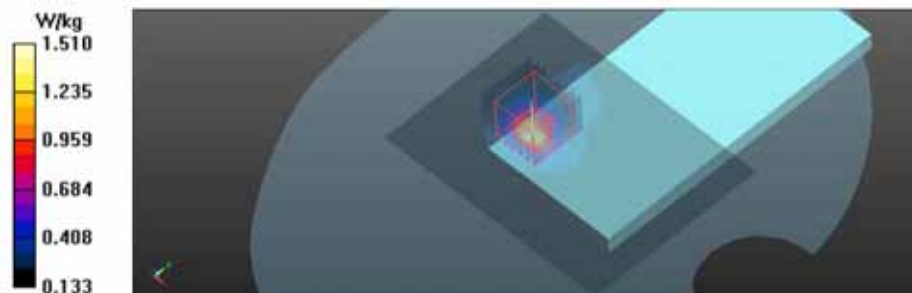
Reference Value = 7.222 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 2.33 W/kg

SAR(1 g) = 0.758 W/kg; SAR(10 g) = 0.372 W/kg

Info: Extrapolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.58 W/kg



Appendix A.90 SAR Test Plots for Cell Phone+ LED View Cover Bluetooth Hotspot

Date: 2018-03-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [Bluetooth_GFSK_DH5_Top_CH0_Hotspot.da53.0](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.7°C

DUT: SM-G960U & EF-NG960; Type: Portable Handset & LED View Cover; Serial: R38JA0KFAKE & R37JA6QNR7XHB3

Communication System: UID 0, Bluetooth 3.0 (0); Frequency: 2402 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2402$ MHz; $\sigma = 1.875$ S/m; $\epsilon_r = 50.926$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3862; ConvF(7.67, 7.67, 7.67); Calibrated: 9/25/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 5/23/2017
- Phantom: SAM 1910 (20deg probe tilt); Type: QD000P40CD; Serial: TP1910
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Body/Bluetooth_GFSK_DH5_Top_CH0_Hotspot/Area Scan (91x121x1): Interpolated
grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0965 W/kg

Body/Bluetooth_GFSK_DH5_Top_CH0_Hotspot/Zoom Scan (7x10x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.191 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.111 W/kg
SAR(1 g) = 0.067 W/kg; SAR(10 g) = 0.042 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0952 W/kg

