

FCC SAR TEST REPORT

Test File No : F690501/RF-SAR002635-A1

Equipment Under Test	LED View Cover
Model Name	EF-NN960
Applicant	SAMSUNG ELECTRONICS Co., Ltd.
Address of Applicant	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677 Republic of Korea
FCC ID	A3L-EFNN960
Call Phone FCC ID	A3LSMN960U
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)	2018-06-28 ~2018-07-20
Date of Issue	2018-08-23

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

This test report does not assure KOLAS accreditation.

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.

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Revision history

Revision	Date of issue	Revisions	Revised By
-	August 10, 2018	Initial issue	-
A1	August 23, 2018	Revision Update - Updated the 10g SAR results of SAR system verification.	Jongho Park

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1 Testing Laboratory

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3 Description of EUT(s)

EUT Type	LED View Cover
Model Name	EF-NN960
Serial Number	R37K36R1MAXHB3
Mode of Operation	NFC
Tx Frequency Range	NFC (13.56 MHz)

4 Information of Attached Cell Phone

EUT Type	Portable Handset
Model Name	SM-N960U
Additional Model	SM-N960U1, SM-N960W, SM-N960XU
Serial Number	R38JA0KFAKE
Band & Mode	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

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)		Phablet 10g (W/kg)	
		Cell Phone	+ LED Cover	Cell Phone	+ LED Cover	Cell Phone	+ LED Cover	Cell Phone	+ LED Cover
PCE	GSM/GPRS/EDGE850	0.22	0.16	0.31	0.23	0.77	0.33	N/A	N/A
PCE	GSM/GPRS/EDGE1900	0.08	0.05	0.33	0.23	0.53	0.57	1.53	1.44
PCE	UMTS 850	0.30	0.23	0.45	0.35	0.87	0.58	N/A	N/A
PCE	UMTS 1750	0.15	0.14	0.72	0.62	0.85	0.81	3.09	3.12
PCE	UMTS 1900	0.17	0.16	0.77	0.65	1.28	1.17	3.06	2.86
PCE	CDMA/EVDO BC10(§90S)	0.24	0.22	0.40	0.33	0.74	0.46	N/A	N/A
PCE	CDMA/EVDO BC0(§22H)	0.33	0.24	0.48	0.38	0.97	0.61	N/A	N/A
PCE	PCS CDMA/EVDO	0.14	0.14	0.73	0.60	1.24	1.21	3.08	3.10
PCE	LTE Band 71	0.16	0.15	0.32	0.25	0.49	0.36	N/A	N/A
PCE	LTE Band 12	0.19	0.18	0.34	0.29	0.59	0.43	N/A	N/A
PCE	LTE Band 17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 13	0.28	0.19	0.45	0.35	0.75	0.48	N/A	N/A
PCE	LTE Band 14	0.21	0.15	0.40	0.28	0.73	0.43	N/A	N/A
PCE	LTE Band 26 (Cell)	0.27	0.20	0.42	0.35	0.90	0.56	N/A	N/A
PCE	LTE Band 5 (Cell)	0.30	0.23	0.45	0.36	0.97	0.55	N/A	N/A
PCE	LTE Band 66 (AWS)	0.12	0.14	0.68	0.46	0.88	0.83	3.17	3.10
PCE	LTE Band 4 (AWS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	0.18	0.15	0.78	0.71	1.04	1.08	2.93	2.94
PCE	LTE Band 2 (PCS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 30	0.15	0.14	0.52	0.44	0.90	0.97	2.06	1.31
PCE	LTE Band 7	0.13	0.12	0.72	0.48	1.28	1.26	2.82	2.80
PCE	LTE Band 41	0.11	0.09	0.89	0.52	1.19	1.20	3.15	2.91
PCE	LTE Band 38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DTS	2.4 GHz WLAN	1.30	0.60	0.10	0.08	0.37	0.22	N/A	N/A
NII	U-NII-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NII	U-NII-2A	0.23	0.13	0.47	0.44	N/A	N/A	1.87	1.11
NII	U-NII-2C	0.30	0.11	0.30	0.29	N/A	N/A	1.22	0.78
NII	U-NII-3	0.24	0.09	0.25	0.19	0.43	0.22	N/A	N/A
DSS/DTS	Bluetooth	1.00	0.55	0.05	0.03	0.14	0.06	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03		1.58	0.88	1.58	1.36	1.52	1.44	3.93	3.97

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 D05v02r05	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	: <± 2°C
Ambient noise & Reflection	: < 0.012 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.

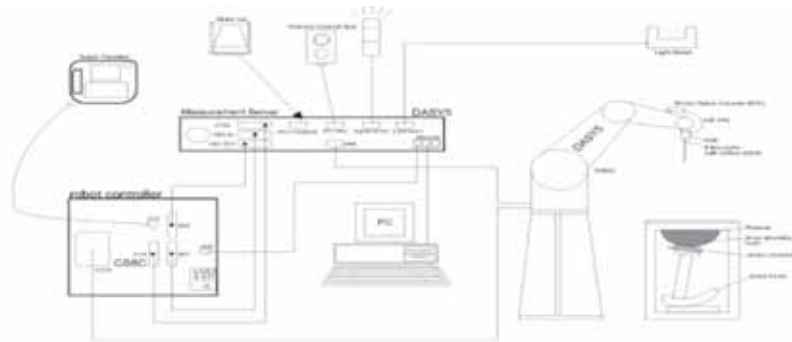


Fig a. The microwave circuit arrangement used for SAR system verification

- 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 mm $\pm$ 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 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: Δx_{Area} , Δy_{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: Δx_{Zoom} , Δy_{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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: 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
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
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 IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 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.

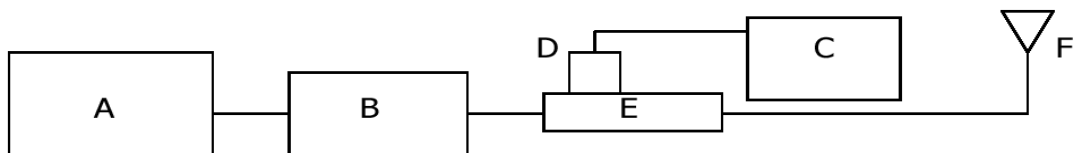


Fig 1. The microwave circuit arrangement used for SAR system verification

- 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)	Target SAR 10 g from Standard (1 W)	Measured SAR 1 g (0.1 W)	Measured SAR 10 g (0.1 W)	Normalized SAR 1 g (1 W)	Normalized SAR 10 g (1 W)	1g Deviation (%)	10g Deviation (%)	Date	Liquid Temp. (°C)
D750V3 SN:1085	3986	750	8.29	5.43	0.810	0.544	8.10	5.44	-2.29	0.18	2018-06-28	22.3
D750V3 SN:1085	3986	750	8.29	5.43	0.797	0.536	7.97	5.36	-3.86	-1.29	2018-06-28	22.3
D835V2 SN:490	3986	835	9.29	6.03	0.954	0.629	9.54	6.29	2.69	4.31	2018-06-28	22.3
D1750V2 SN:1116	3986	1750	36.60	19.30	3.700	1.99	37.00	19.90	1.09	3.11	2018-07-05	22.1
D1900V2 SN:5d033	3986	1900	39.90	20.90	4.070	2.14	40.70	21.40	2.01	2.39	2018-06-28	22.1
D2300V2 SN:1028	3933	2300	48.80	23.40	4.810	2.29	48.10	22.90	-1.43	-2.14	2018-07-11	22.3
D2450V2 SN:734	3986	2450	51.40	24.00	5.190	2.51	51.90	25.10	0.97	4.58	2018-07-07	22.5
D2450V2 SN:734	3986	2450	51.40	24.00	5.130	2.46	51.30	24.60	-0.19	2.50	2018-07-11	22.3
D2450V2 SN:734	3986	2450	51.40	24.00	5.380	2.59	53.80	25.90	4.67	7.92	2018-07-16	22.1
D2600V2 SN:1038	3986	2600	57.10	25.40	5.570	2.49	55.70	24.90	-2.45	-1.97	2018-07-10	22.5
D5GHzV2 SN:1130	3986	5300	83.10	23.80	7.840	2.23	78.40	22.30	-5.66	-6.30	2018-07-12	22.2
D5GHzV2 SN:1130	3986	5600	85.30	24.50	8.700	2.46	87.00	24.60	1.99	0.41	2018-07-12	22.2
D5GHzV2 SN:1130	3986	5800	83.00	23.60	8.350	2.36	83.50	23.60	0.60	0.00	2018-07-13	22.3

Table1. Results system verification

Body SAR System Verification

Verification Kit	Probe S/N	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Target SAR 10 g from Standard (1 W)	Measured SAR 1 g (0.1 W)	Measured SAR 10 g (0.1 W)	Normalized SAR 1 g (1 W)	Normalized SAR 10 g (1 W)	1g Deviation (%)	10g Deviation (%)	Date	Liquid Temp. (°C)
D750V3 SN:1085	3986	750	8.68	5.72	0.857	0.578	8.57	5.78	-1.27	1.05	2018-06-29	22.2
D750V3 SN:1085	3986	750	8.68	5.72	0.840	0.565	8.40	5.65	-3.23	-1.22	2018-06-29	22.2
D835V2 SN:490	3986	835	9.63	6.31	0.910	0.603	9.10	6.03	-5.50	-4.44	2018-06-30	22.3
D1750V2 SN:1116	3986	1750	36.80	19.60	3.550	1.91	35.50	19.10	-3.53	-2.55	2018-07-05	22.1
D1900V2 SN:5d033	3986	1900	40.50	21.50	4.120	2.17	41.20	21.70	1.73	0.93	2018-07-03	22.4
D2300V2 SN:1028	3933	2300	46.90	22.70	4.820	2.31	48.20	23.10	2.77	1.76	2018-07-11	22.1
D2450V2 SN:734	3986	2450	49.40	23.30	5.200	2.50	52.00	25.00	5.26	7.30	2018-07-07	22.5
D2450V2 SN:734	3986	2450	49.40	23.30	4.720	2.25	47.20	22.50	-4.45	-3.43	2018-07-11	22.1
D2600V2 SN:1038	3986	2600	54.40	24.30	5.680	2.53	56.80	25.30	4.41	4.12	2018-07-10	21.9
D2600V2 SN:1038	3986	2600	54.40	24.30	5.660	2.51	56.60	25.10	4.04	3.29	2018-07-20	22.5
D5GHzV2 SN:1130	3986	5300	76.00	21.30	7.930	2.26	79.30	22.60	4.34	6.10	2018-07-12	21.9
D5GHzV2 SN:1130	3986	5600	80.10	22.40	8.620	2.42	86.20	24.20	7.62	8.04	2018-07-12	21.9
D5GHzV2 SN:1130	3986	5800	75.70	20.90	7.870	2.20	78.70	22.00	3.96	5.26	2018-07-13	22.1

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, 2018-06-28	43.06	0.91	22.3
		Target Tissue	41.90	0.89	
		Deviation (%)	2.77	2.25	
680.5		Measured, 2018-06-28	43.97	0.85	
		Deviation (%)	4.94	-4.49	
707.5		Measured, 2018-06-28	43.59	0.87	
	Deviation (%)	4.03	-2.25		
750.0	Head	Measured, 2018-06-28	43.23	0.86	22.3
		Target Tissue	41.90	0.89	
		Deviation (%)	3.17	-3.37	
782.0		Measured, 2018-06-28	42.83	0.90	
		Deviation (%)	2.22	1.12	
793.0		Measured, 2018-06-28	42.67	0.91	
	Deviation (%)	1.84	2.25		
750.0	Body	Measured, 2018-06-29	54.68	1.00	22.2
		Target Tissue	55.50	0.96	
		Deviation (%)	-1.48	4.17	
680.5		Measured, 2018-06-29	55.45	0.93	
		Deviation (%)	-0.09	-3.12	
707.5		Measured, 2018-06-29	55.11	0.95	
	Deviation (%)	-0.70	-1.04		
750.0	Body	Measured, 2018-06-29	55.08	0.93	22.2
		Target Tissue	55.50	0.96	
		Deviation (%)	-0.76	-3.12	
782.0		Measured, 2018-06-29	54.77	0.97	
		Deviation (%)	-1.32	1.04	
793.0		Measured, 2018-06-29	54.63	0.98	
	Deviation (%)	-1.57	2.08		
835.0	Head	Measured, 2018-06-28	40.67	0.92	22.3
		Target Tissue	41.50	0.90	
		Deviation (%)	-2.00	2.22	
820.1		Measured, 2018-06-28	40.81	0.91	
		Deviation (%)	-1.66	1.11	
836.6		Measured, 2018-06-28	40.64	0.92	
	Deviation (%)	-2.07	2.22		

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
835.0	Body	Measured, 2018-06-30	55.00	0.97	22.3
		Target Tissue	55.20	0.97	
		Deviation (%)	-0.36	0.00	
820.1		Measured, 2018-06-30	55.07	0.96	
		Deviation (%)	-0.24	-1.03	
848.8		Measured, 2018-06-30	54.94	0.99	
		Deviation (%)	-0.47	2.06	
1750.0	Head	Measured, 2018-07-05	38.68	1.40	22.1
		Target Tissue	40.10	1.37	
		Deviation (%)	-3.54	2.19	
1732.4		Measured, 2018-07-05	38.72	1.38	
		Deviation (%)	-3.44	0.73	
1745.0		Measured, 2018-07-05	38.68	1.40	
		Deviation (%)	-3.54	2.19	
1750.0	Body	Measured, 2018-07-05	55.25	1.49	22.1
		Target Tissue	54.40	1.49	
		Deviation (%)	1.56	0.00	
1712.4		Measured, 2018-07-05	55.39	1.45	
		Deviation (%)	1.82	-2.68	
1752.6		Measured, 2018-07-05	55.23	1.49	
		Deviation (%)	1.53	0.00	
1900.0	Head	Measured, 2018-06-28	39.16	1.40	22.1
		Target Tissue	40.00	1.40	
		Deviation (%)	-2.10	0.00	
1880.0		Measured, 2018-06-28	39.25	1.38	
		Deviation (%)	-1.88	-1.43	
1905.0		Measured, 2018-06-28	39.14	1.40	
		Deviation (%)	-2.15	0.00	
1900.0	Body	Measured, 2018-07-03	53.33	1.54	22.4
		Target Tissue	53.30	1.52	
		Deviation (%)	0.06	1.32	
1850.2		Measured, 2018-07-03	53.55	1.48	
		Deviation (%)	0.47	-2.63	
1908.75		Measured, 2018-07-03	53.29	1.54	
		Deviation (%)	-0.02	1.32	
2300.0	Head	Measured, 2018-07-11	38.46	1.62	22.3
		Target Tissue	39.50	1.67	
		Deviation (%)	-2.63	-2.99	
2310.0		Measured, 2018-07-11	38.45	1.63	
		Deviation (%)	-2.66	-2.40	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
2300.0	Body	Measured, 2018-07-11	52.93	1.78	22.1
		Target Tissue	52.90	1.81	
		Deviation (%)	0.06	-1.66	
2310.0		Measured, 2018-07-11	52.91	1.79	
		Deviation (%)	0.02	-1.10	
2450.0	Head	Measured, 2018-07-07	38.19	1.80	22.5
		Target Tissue	39.20	1.80	
		Deviation (%)	-2.58	0.00	
2437.0		Measured, 2018-07-07	38.24	1.78	
		Deviation (%)	-2.45	-1.11	
2441.0		Measured, 2018-07-07	38.22	1.79	
	Deviation (%)	-2.50	-0.56		
2450.0	Head	Measured, 2018-07-11	38.05	1.77	22.3
		Target Tissue	39.20	1.80	
		Deviation (%)	-2.93	-1.67	
2412.0		Measured, 2018-07-11	38.16	1.73	
		Deviation (%)	-2.65	-3.89	
2437.0		Measured, 2018-07-11	38.09	1.76	
	Deviation (%)	-2.83	-2.22		
2450.0	Body	Measured, 2018-07-07	51.85	1.97	22.5
		Target Tissue	52.70	1.95	
		Deviation (%)	-1.61	1.03	
2437.0		Measured, 2018-07-07	51.89	1.95	
		Deviation (%)	-1.54	0.00	
2480.0		Measured, 2018-07-07	51.78	2.00	
	Deviation (%)	-1.75	2.56		
2450.0	Body	Measured, 2018-07-11	52.59	1.93	22.1
		Target Tissue	52.70	1.95	
		Deviation (%)	-0.21	-1.03	
2437.0		Measured, 2018-07-11	52.63	1.92	
		Deviation (%)	-0.13	-1.54	
2450.0	Head	Measured, 2018-07-16	38.09	1.79	22.1
		Target Tissue	39.20	1.80	
		Deviation (%)	-2.83	-0.56	
2412.0		Measured, 2018-07-16	38.20	1.75	
		Deviation (%)	-2.55	-2.78	
2600.0	Head	Measured, 2018-07-10	38.13	2.04	22.5
		Target Tissue	39.00	1.96	
		Deviation (%)	-2.23	4.08	
2549.5		Measured, 2018-07-10	38.17	2.00	
		Deviation (%)	-2.13	2.04	
2560.0		Measured, 2018-07-10	38.17	2.02	
	Deviation (%)	-2.13	3.06		

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
2600.0	Body	Measured, 2018-07-10	51.44	2.24	21.9
		Target Tissue	52.50	2.16	
		Deviation (%)	-2.02	3.70	
2506.0		Measured, 2018-07-10	51.48	2.08	
2560.0		Measured, 2018-07-10	51.38	2.20	
		Deviation (%)	-2.13	1.85	
2600.0	Body	Measured, 2018-07-20	51.84	2.21	22.5
		Target Tissue	52.50	2.16	
		Deviation (%)	-1.26	2.32	
2506.0		Measured, 2018-07-20	52.09	2.09	
Deviation (%)		-0.78	-3.24		
5300.0	Head	Measured, 2018-07-12	34.54	4.76	22.2
		Target Tissue	35.90	4.76	
		Deviation (%)	-3.79	0.00	
5290.0		Measured, 2018-07-12	34.54	4.75	
		Deviation (%)	-3.79	-0.21	
5300.0	Body	Measured, 2018-07-12	49.42	5.36	21.9
		Target Tissue	48.90	5.42	
		Deviation (%)	1.06	-1.11	
5260.0		Measured, 2018-07-12	49.50	5.29	
		Deviation (%)	1.23	-2.40	
5320.0		Measured, 2018-07-12	49.39	5.39	
	Deviation (%)	1.00	-0.55		
5600.0	Head	Measured, 2018-07-12	34.46	4.96	22.2
		Target Tissue	35.50	5.07	
		Deviation (%)	-2.93	-2.17	
5690.0		Measured, 2018-07-12	34.29	5.07	
		Deviation (%)	-3.41	0.00	
5600.0	Body	Measured, 2018-07-12	47.35	5.61	21.9
		Target Tissue	48.50	5.77	
		Deviation (%)	-2.37	-2.77	
5720.0		Measured, 2018-07-12	47.06	5.76	
		Deviation (%)	-2.97	-0.17	
5800.0	Head	Measured, 2018-07-13	34.15	5.15	22.3
		Target Tissue	35.30	5.27	
		Deviation (%)	-3.26	-2.28	
5775.0		Measured, 2018-07-13	34.20	5.11	
		Deviation (%)	-3.12	-3.04	
5800.0	Body	Measured, 2018-07-13	46.23	5.93	22.1
		Target Tissue	48.20	6.00	
		Deviation (%)	-4.09	-1.17	
5785.0		Measured, 2018-07-13	46.25	5.91	
		Deviation (%)	-4.05	-1.50	

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	DASY5: 52.10.0(1446) SEMCAD X: 14.6.10(7417)				
Equipment	Type	Serial Number	Cal Date	Cal Interval	Cal Due
Robot	TX90XL	F12/5LP8A1/A/01	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1720	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1721	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1645	N/A	N/A	N/A
Verification Dipole	D750V3	1085	2017-03-15	Biennial	2019-03-15
Verification Dipole	D835V2	490	2018-06-01	Biennial	2020-06-01
Verification Dipole	D1750V2	1116	2017-07-21	Biennial	2019-07-21
Verification Dipole	D1900V2	5d033	2018-05-28	Biennial	2020-05-28
Verification Dipole	D2300V2	1028	2017-11-15	Biennial	2019-11-15
Verification Dipole	D2450V2	734	2018-05-30	Biennial	2020-05-30
Verification Dipole	D2600V2	1038	2017-05-30	Biennial	2019-05-30
Verification Dipole	D5GHzV2	1130	2018-05-25	Biennial	2020-05-25
Dielectric Assessment Kit	DAK-3.5	1228	2017-11-21	Annual	2018-11-21
DAE	DAE4	1430	2018-03-16	Annual	2019-03-16
E-Field Probe	EX3DV4	3986	2018-03-23	Annual	2019-03-23
E-Field Probe	EX3DV4	3933	2017-09-28	Annual	2018-09-28
Network Analyzer	E5071C	MY46111535	2018-05-24	Annual	2019-05-24
Power Meter	E4419B	GB43311125	2018-06-15	Annual	2019-06-15
Power Meter	E4416A	GB41292123	2017-12-13	Annual	2018-12-13
Power Sensor	E9300H	MY41495307	2018-06-15	Annual	2019-06-15
Power Sensor	E9300H	MY41495314	2018-06-15	Annual	2019-06-15
Power Sensor	E9327A	US40441371	2017-12-13	Annual	2018-12-13
Signal Generator	E8247C	MY43321024	2018-06-14	Annual	2019-06-14
Power Amplifier	2002-BBS2C4AEL	1029 D/C 0341	2017-12-07	Annual	2018-12-07
Power Amplifier	BLMA1060-10	1711221	2018-06-15	Annual	2019-06-15
Dual Directional Coupler	778D	MY52180497	2018-06-15	Annual	2019-06-15
Dual Directional Coupler	772D	MY52180226	2018-06-15	Annual	2019-06-15
LP Filter	LA-15N	LF02	2018-06-23	Annual	2019-06-23
LP Filter	LA-30N	LF03	2018-06-23	Annual	2019-06-23
LP Filter	LA-60N	LF04	2018-06-23	Annual	2019-06-23
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	2018-06-18	Annual	2019-06-18
Digital Thermometer	SDT25	16031500243	2017-08-11	Annual	2018-08-11
Communication Tester	MT8821C	6201502996	2017-09-14	Annual	2018-09-14
Spectrum Analyzer	FSV30	100007	2017-12-08	Annual	2018-12-08

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

GSM/UMTS/CDMA Maximum Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)			
			1TX Slots	2TX Slots	3TX Slots	4TX Slots
GSM 850	Maximum	33.5	33.5	31.5	29.5	28.5
	Nominal	32.5	32.5	30.5	28.5	27.5
GSM 1900	Maximum	31.0	31.0	28.5	26.5	25.5
	Nominal	30.0	30.0	27.5	25.5	24.5

Mode / Band		Modulated Average
UMTS 850	Maximum	25.8
	Nominal	24.8
UMTS 1750	Maximum	25.5
	Nominal	24.5
UMTS 1900	Maximum	25.2
	Nominal	24.2
CDMA/EVDO BC10(§ 90S)	Maximum	26.0
	Nominal	25.0
CDMA/EVDO BC0 (§ 22H)	Maximum	26.0
	Nominal	25.0
PCS CDMA/EVDO	Maximum	25.0
	Nominal	24.0

LTE Maximum Power

Mode / Band		Modulated Average
LTE Band 71	Maximum	25.8
	Nominal	24.8
LTE Band 12	Maximum	25.8
	Nominal	24.8
LTE Band 13	Maximum	25.8
	Nominal	24.8
LTE Band 14	Maximum	25.5
	Nominal	24.5
LTE Band 26	Maximum	25.8
	Nominal	24.8
LTE Band 5	Maximum	25.8
	Nominal	24.8
LTE Band 66	Maximum	25.5
	Nominal	24.5
LTE Band 25	Maximum	25.2
	Nominal	24.2
LTE Band 30	Maximum	23.5
	Nominal	22.5
LTE Band 7	Maximum	24.0
	Nominal	23.0
LTE Band 41(PC2)	Maximum	28.2
	Nominal	27.2
LTE Band 41(PC3)	Maximum	25.0
	Nominal	24.0

GSM/UMTS/CDMA/LTE Reduced Power - Hotspot Mode Activated

Mode / Band		Burst Average GMSK (dBm)			
		1TX Slots	2TX Slots	3TX Slots	4TX Slots
GSM/GPRS/EDGE 1900	Maximum	27.5	25.8	23.8	22.0
	Nominal	26.5	24.8	22.8	21.0

Mode / Band		Modulated Average
UMTS 1750	Maximum	20.5
	Nominal	19.5
UMTS 1900	Maximum	20.5
	Nominal	19.5
PCS CDMA/EVDO	Maximum	21.0
	Nominal	20.0
LTE Band 66	Maximum	21.0
	Nominal	20.0
LTE Band 25	Maximum	20.5
	Nominal	19.5
LTE Band 30	Maximum	21.0
	Nominal	20.0
LTE Band 7	Maximum	20.5
	Nominal	19.5
LTE Band 41(PC2)	Maximum	22.5
	Nominal	21.5
LTE Band 41(PC3)	Maximum	22.5
	Nominal	21.5

GSM/UMTS/CDMA/LTE Reduced Power – Grip Sensor Activated

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)			
			1TX Slots	2TX Slots	3TX Slots	4TX Slots
GSM/GPRS/EDGE 1900	Maximum	27.5	27.5	25.8	23.8	22.5
	Nominal	26.5	26.5	24.8	22.8	21.5

Mode / Band		Modulated Average
UMTS 1750	Maximum	22.0
	Nominal	21.0
UMTS 1900	Maximum	20.5
	Nominal	19.5
PCS CDMA/EVDO	Maximum	21.0
	Nominal	20.0
LTE Band 66	Maximum	22.0
	Nominal	21.0
LTE Band 25	Maximum	20.5
	Nominal	19.5
LTE Band 30	Maximum	22.5
	Nominal	21.5
LTE Band 7	Maximum	21.0
	Nominal	20.0
LTE Band 41(PC3)	Maximum	24.0
	Nominal	23.0

WLAN Maximum Power

Mode / Band		Modulated Average
IEEE 802.11b(2.4 GHz) SISO	Maximum	21.0
	Nominal	20.0
IEEE 802.11a, n HT20 (5.3 GHz) SISO	Maximum	18.0
	Nominal	17.0
IEEE 802.11a, n HT20 (5.6, 5.8 GHz) SISO	Maximum	17.5
	Nominal	16.5
IEEE 802.11a, n HT20 (5.3 GHz) MIMO	Maximum	21.0
	Nominal	20.0

WLAN Reduced Power

Mode / Band		Modulated Average
IEEE 802.11b(2.4 GHz) SISO	Maximum	17.0
	Nominal	16.0
IEEE 802.11ac(5 GHz) SISO	Maximum	14.0
	Nominal	13.0

Bluetooth Maximum Power

Mode / Band		Modulated Average
Bluetooth (1 Mbps)	Maximum	16.5
	Nominal	15.5

18 RF Conducted Power Measurement

CDMA/GSM/UMTS Maximum Conducted power

Mode / Band	Frequency (MHz)	Channel	Service	Conducted Power (dBm)
GSM 850	836.60	190	GSM	32.81
GSM 1900	1880.00	661	GSM	29.76
UMTS 850	836.60	4183	RMC	25.17
UMTS 1750	1732.40	1412	RMC	24.49
UMTS 1900	1880.00	9400	RMC	24.50
UMTS 1900	1907.60	9538	RMC	24.28
CDMA BC10	820.10	564	EVDO Rev.A	25.49
CDMA BC10	820.10	564	TDSO / SO32	25.50
CDMA BC0	836.52	384	RC3 / SO55	24.83
CDMA BC0	836.52	384	TDSO / SO32	24.91
PCS CDMA	1880.00	600	EVDO Rev.A	24.46
PCS CDMA	1880.00	600	TDSO / SO32	24.42

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	50	25.18
LTE Band 12	10	N/A	707.50	23095	QPSK	1	0	24.63
LTE Band 13	10	N/A	782.00	23230	QPSK	1	49	24.29
LTE Band 14	10	N/A	793.00	23330	QPSK	1	49	24.81
LTE Band 26	15	N/A	831.50	26865	QPSK	1	0	24.59
LTE Band 5	10	N/A	836.50	20525	QPSK	1	25	24.60
LTE Band 66	20	N/A	1745.00	132322	QPSK	1	0	24.69
LTE Band 66	20	N/A	1720.00	132072	QPSK	1	0	24.56
LTE Band 25	20	N/A	1905.00	26590	QPSK	1	0	24.33
LTE Band 30	10	Ant B	2310.00	27710	QPSK	1	0	22.62
LTE Band 7	20	Ant B	2560.00	21350	QPSK	1	0	23.06
LTE Band 41	20	N/A	2549.50	40185	QPSK	1	0	27.14

GSM/UMTS/CDMA Reduced Conducted power - Hotspot Mode Activated

Mode / Band	Frequency (MHz)	Channel	Service	Conducted Power (dBm)
GSM 850	848.80	251	GPRS 4TX	27.14
GSM 1900	1880.00	661	GPRS 3TX	22.99
UMTS 850	846.60	4233	RMC	25.14
UMTS 1750	1752.60	1513	RMC	19.60
UMTS 1900	1907.60	9538	RMC	19.27
CDMA BC10	820.10	564	EVDO Rev.0	25.54
CDMA BC0	848.31	777	EVDO Rev.0	24.86
PCS CDMA	1908.75	1175	EVDO Rev.0	19.95

LTE Reduced Conducted power - Hotspot Mode Activated

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	50	25.18
LTE Band 12	10	N/A	707.50	23095	QPSK	1	0	24.63
LTE Band 13	10	N/A	782.00	23230	QPSK	1	49	24.29
LTE Band 14	10	N/A	793.00	23330	QPSK	1	49	24.81
LTE Band 26	15	N/A	831.50	26865	QPSK	1	0	24.59
LTE Band 5	10	N/A	836.50	20525	QPSK	1	25	24.60
LTE Band 66	20	N/A	1720.00	132072	QPSK	1	0	19.52
LTE Band 25	20	N/A	1905.00	26590	QPSK	100	0	19.37
LTE Band 30	10	Ant B	2310.00	27710	QPSK	50	0	20.42
LTE Band 7	20	Ant B	2560.0	21350	QPSK	50	0	19.41
LTE Band 41	20	N/A	2593.00	40620	QPSK	1	0	21.19
			2573.20	40422	QPSK	1	99	

GSM/UMTS/CDMA Reduced Conducted power - Grip Sensor Activated

Mode / Band	Frequency (MHz)	Channel	Service	Conducted Power (dBm)
GSM 1900	1850.20	512	GPRS 3TX	22.96
UMTS 1750	1712.40	1312	RMC	20.68
UMTS 1750	1732.40	1412	RMC	20.81
UMTS 1900	1880.00	9400	RMC	19.42
PCS CDMA	1908.75	1175	EVDO Rev.0	19.95
PCS CDMA	1880.00	600	EVDO Rev.0	19.99

LTE Reduced Conducted power - Grip Sensor Activated

Band	Bandwidth	Antenna Config.	Frequency (MHz)	Channel	Modulation	RB Size	RB Offset	Conducted Power (dBm)
LTE Band 66	20	N/A	1720.00	132072	QPSK	50	0	20.68
LTE Band 66	20	N/A	1745.00	132322	QPAK	50	0	20.81
LTE Band 25	20	N/A	1905.00	26590	QPSK	1	0	19.51
LTE Band 25	20	N/A	1905.00	26590	QPSK	50	0	19.46
LTE Band 30	10	Ant A	2310.00	27710	QPSK	25	0	21.58
LTE Band 7	20	Ant B	2510.00	20850	QPSK	1	0	19.38
LTE Band 41	20	N/A	2506.00	39750	QPSK	50	50	22.76
LTE Band 41	20	N/A	2506.00	39750	QPSK	1	99	22.53

WLAN Maximum Conducted power

Mode / Band	Antenna	Frequency (MHz)	Channel	Conducted Power (dBm)
802.11b	2	2437.0	6	20.24
802.11a	2	5260.0	52	16.95
802.11a	2	5270.0	144	17.35
802.11a	2	5785.0	157	17.26

WLAN MIMO Maximum Conducted power

Mode / Band	Antenna	Frequency (MHz)	Channel	Conducted Power (dBm) Ant1	Conducted Power (dBm) Ant2
802.11n HT20	MIMO	5320.0	64	17.21	16.89

WLAN Reduced Conducted power

Mode / Band	Antenna	Frequency (MHz)	Channel	Conducted Power (dBm)
802.11b	2	2437.0	6	16.65
802.11ac VHT80	2	5290.0	58	13.69
802.11ac VHT80	2	5690.0	138	13.55
802.11ac VHT80	2	5775.0	155	13.43

Bluetooth Maximum Conducted power

Mode / Band	Frequency (MHz)	Channel	Conducted Power (dBm)
Bluetooth	2441.00	39	16.47
	2480.00	78	16.50

19 After-Market NFC Cover

A handset must be tested according to all required SAR test procedures, without the after-market accessory (additional batteries, battery cover and sleeve, etc.), to demonstrate compliance. For handsets with additional batteries, NFC and wireless charging battery covers or similar accessory (sleeve carrier, etc.), the highest reported SAR for each wireless technology (1xRTT, EVDO, WCDMA, GSM, Wi-Fi, etc.), frequency band, operating mode (different modes/configurations within each wireless technology) and applicable exposure condition (head, body-worn accessory, hotspot mode, etc.) without the accessory must be repeated with the specific accessory attached. In addition, for test cases where the measured SAR for a handset without the accessory is greater than 1.2 W/kg, these tests should be repeated with the additional batteries, NFC and wireless charging battery covers or similar accessory.

When there are noticeable changes in SAR distributions for tests with and without the accessory; for example, shifting of the peak SAR location, a KDB inquiry should be submitted to determine if additional SAR tests may be required.

20 SAR Data Summary

20.1 Head SAR data

GSM/UMTS/CDMA 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				
Cell Phone											
Right Touch	GSM 850	GSM	N/A	836.60	190	32.81	33.50	0.188	1.172	0.220	A2
Left Touch	GSM 1900	GSM	N/A	1880.00	661	29.76	31.00	0.067	1.172	0.079	
Right Touch	UMTS 850	RMC	4	836.60	4183	25.17	25.80	0.262	1.156	0.303	
Left Touch	UMTS 1750	RMC	16	1732.40	1412	24.49	25.50	0.118	1.262	0.149	
Left Touch	UMTS 1900	RMC	17	1880.00	9400	24.50	25.20	0.143	1.175	0.168	
Right Touch	CDMA BC10	EVDO Rev.A	4	820.10	564	25.49	26.00	0.209	1.125	0.235	
Right Touch	CDMA BC0	RC3 / SO55	4	836.52	384	24.83	26.00	0.248	1.309	0.325	
Left Touch	PCS CDMA	EVDO Rev.A	17	1880.00	600	24.46	25.00	0.127	1.132	0.144	
Cell Phone+ LED Cover											
Right Touch	GSM 850	GSM	N/A	836.60	190	32.81	33.50	0.132	1.172	0.155	A2
Left Touch	GSM 1900	GSM	N/A	1880.00	661	29.76	31.00	0.044	1.172	0.052	
Right Touch	UMTS 850	RMC	4	836.60	4183	25.17	25.80	0.197	1.156	0.228	
Left Touch	UMTS 1750	RMC	16	1732.40	1412	24.49	25.50	0.114	1.262	0.144	
Left Touch	UMTS 1900	RMC	17	1880.00	9400	24.50	25.20	0.135	1.175	0.159	
Right Touch	CDMA BC10	EVDO Rev.A	4	820.10	564	25.49	26.00	0.191	1.125	0.215	
Right Touch	CDMA BC0	RC3 / SO55	4	836.52	384	24.83	26.00	0.183	1.309	0.240	
Left Touch	PCS CDMA	EVDO Rev.A	17	1880.00	600	24.46	25.00	0.124	1.132	0.140	

LTE FDD Head SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna	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				
Cell Phone															
Right Touch	LTE 71	20	5	N/A	680.50	133297	QPSK	1	50	25.18	25.80	0.135	1.153	0.156	A3
Right Touch	LTE 12	10	68	N/A	707.50	23095	QPSK	1	0	24.63	25.80	0.147	1.309	0.192	
Right Touch	LTE 13	10	1	N/A	782.00	23230	QPSK	1	49	24.29	25.80	0.198	1.416	0.280	
Right Touch	LTE 14	10	68	N/A	793.00	23330	QPSK	1	49	24.81	25.50	0.180	1.172	0.211	
Right Touch	LTE 26	15	4	N/A	831.50	26865	QPSK	1	0	24.59	25.80	0.204	1.321	0.269	
Right Touch	LTE 5	10	4	N/A	836.50	20525	QPSK	1	25	24.60	25.80	0.229	1.318	0.302	
Left Touch	LTE 66	20	16	N/A	1745.00	132322	QPSK	1	0	24.69	25.50	0.101	1.205	0.122	
Left Touch	LTE 25	20	17	N/A	1905.00	26590	QPSK	1	0	24.33	25.20	0.146	1.222	0.178	
Right Touch	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	22.62	23.50	0.120	1.225	0.147	
Left Touch	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	1	0	23.06	24.00	0.105	1.242	0.130	
Cell Phone+ LED Cover															
Right Touch	LTE 71	20	5	N/A	680.50	133297	QPSK	1	50	25.18	25.80	0.129	1.153	0.149	A3
Right Touch	LTE 12	10	68	N/A	707.50	23095	QPSK	1	0	24.63	25.80	0.135	1.309	0.177	
Right Touch	LTE 13	10	1	N/A	782.00	23230	QPSK	1	49	24.29	25.80	0.135	1.416	0.191	
Right Touch	LTE 14	10	68	N/A	793.00	23330	QPSK	1	49	24.81	25.50	0.130	1.172	0.152	
Right Touch	LTE 26	15	4	N/A	831.50	26865	QPSK	1	0	24.59	25.80	0.152	1.321	0.201	
Right Touch	LTE 5	10	4	N/A	836.50	20525	QPSK	1	25	24.60	25.80	0.176	1.318	0.232	
Left Touch	LTE 66	20	16	N/A	1745.00	132322	QPSK	1	0	24.69	25.50	0.114	1.205	0.137	
Left Touch	LTE 25	20	17	N/A	1905.00	26590	QPSK	1	0	24.33	25.20	0.126	1.222	0.154	
Right Touch	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	22.62	23.50	0.112	1.225	0.137	
Left Touch	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	1	0	23.06	24.00	0.099	1.242	0.123	

LTE TDD Head SAR

EUT Position	Mode	Uplink	Bandwidth (MHz)	Component Carrier	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				
Cell Phone															
Right Tilt	LTE 41	1 CC Uplink	20	N/A	2549.50	40185	QPSK	1	0	27.14	28.20	0.084	1.276	0.107	A4
Cell Phone+ LED Cover															
Right Tilt	LTE 41	1 CC Uplink	20	N/A	2549.50	40185	QPSK	1	0	27.14	28.20	0.072	1.276	0.092	A4

WLAN Head SAR

EUT Position	Mode	Antenna	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					
Cell Phone											
Right Touch	802.11b	2	2437.0	6	16.65	17.00	1.190	1.084	1.010	1.303	A5
Right Touch	802.11ac VHT80	2	5290.0	58	13.69	14.00	0.199	1.074	1.058	0.226	
Right Touch	802.11ac VHT80	2	5690.0	138	13.55	14.00	0.253	1.109	1.058	0.297	
Right Touch	802.11ac VHT80	1	5775.0	155	13.53	14.00	0.032	1.114	1.057	0.038	
Right Touch	802.11ac VHT80	2	5775.0	155	13.43	14.00	0.198	1.140	1.058	0.239	
Cell Phone+ LED Cover											
Right Touch	802.11b	2	2437.0	6	16.65	17.00	0.549	1.084	1.010	0.601	A5
Right Touch	802.11ac VHT80	2	5290.0	58	13.69	14.00	0.110	1.074	1.058	0.125	
Right Touch	802.11ac VHT80	2	5690.0	138	13.55	14.00	0.092	1.109	1.058	0.108	
Right Touch	802.11ac VHT80	1	5775.0	155	13.53	14.00	0.021	1.114	1.057	0.025	
Right Touch	802.11ac VHT80	2	5775.0	155	13.43	14.00	0.071	1.140	1.058	0.086	

DTS MIMO Head SAR

EUT Position	Mode	Antenna	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					
Cell Phone													
Right Tilt	802.11n	MIMO	2412.0	1	13.56	14.00	13.95	14.00	0.823	1.107	1.014	0.924	A6
Cell Phone+ LED Cover													
Right Tilt	802.11n	MIMO	2412.0	1	13.56	14.00	13.95	14.00	0.448	1.107	1.014	0.503	A6

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					
Cell Phone											
Right Touch	Bluetooth	FHSS	2441.0	39	16.47	16.50	0.766	1.007	1.294	0.998	A7
Cell Phone+ LED Cover											
Right Touch	Bluetooth	FHSS	2441.0	39	16.47	16.50	0.421	1.007	1.294	0.549	A7

20.2 Body Worn SAR data

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				
Cell Phone												
Rear	GSM 850	GSM	N/A	836.6	190	15mm	32.81	33.50	0.260	1.172	0.305	A8
Rear	GSM 1900	GSM	N/A	1880.00	661	15mm	29.76	31.00	0.244	1.330	0.325	
Rear	UMTS 850	RMC	0	836.60	4183	15mm	25.17	25.80	0.388	1.156	0.449	
Rear	UMTS 1750	RMC	16	1732.40	1412	15mm	24.49	25.50	0.572	1.262	0.722	
Rear	UMTS 1900	RMC	17	1880.00	9400	15mm	24.50	25.20	0.656	1.175	0.771	
Rear	CDMA BC10	TDSO/SO32	0	820.10	564	15mm	25.50	26.00	0.358	1.122	0.402	
Rear	CDMA BC0	TDSO/SO32	0	836.52	384	15mm	24.91	26.00	0.373	1.285	0.479	
Rear	PCS CDMA	TDSO/SO32	17	1880.00	600	15mm	24.42	25.00	0.639	1.143	0.730	
Cell Phone+ LED Cover												
Rear	GSM 850	GSM	N/A	836.6	190	15mm	32.81	33.50	0.199	1.172	0.233	A8
Rear	GSM 1900	GSM	N/A	1880.00	661	15mm	29.76	31.00	0.175	1.330	0.233	
Rear	UMTS 850	RMC	0	836.60	4183	15mm	25.17	25.80	0.300	1.156	0.347	
Rear	UMTS 1750	RMC	16	1732.40	1412	15mm	24.49	25.50	0.493	1.262	0.622	
Rear	UMTS 1900	RMC	17	1880.00	9400	15mm	24.50	25.20	0.551	1.175	0.647	
Rear	CDMA BC10	TDSO/SO32	0	820.10	564	15mm	25.50	26.00	0.294	1.122	0.330	
Rear	CDMA BC0	TDSO/SO32	0	836.52	384	15mm	24.91	26.00	0.297	1.285	0.382	
Rear	PCS CDMA	TDSO/SO32	17	1880.00	600	15mm	24.42	25.00	0.524	1.143	0.599	

LTE FDD Body Worn SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna	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				
Cell Phone																
Rear	LTE 71	20	2	Ant A	680.50	133297	QPSK	1	50	15mm	25.18	25.80	0.275	1.153	0.317	A9
Rear	LTE 12	10	68	Ant A	707.50	23095	QPSK	1	0	15mm	24.63	25.80	0.262	1.309	0.343	
Rear	LTE 13	10	0	Ant A	782.00	23230	QPSK	1	49	15mm	24.29	25.80	0.317	1.416	0.449	
Rear	LTE 14	10	1	Ant A	793.00	23330	QPSK	1	49	15mm	24.81	25.50	0.339	1.172	0.397	
Rear	LTE 26	15	4	Ant A	831.50	26865	QPSK	1	0	15mm	24.59	25.80	0.315	1.321	0.416	
Rear	LTE 5	10	4	Ant A	836.50	20525	QPSK	1	25	15mm	24.60	25.80	0.340	1.318	0.448	
Rear	LTE 66	20	16	Ant A	1720.00	132072	QPSK	1	0	15mm	24.56	25.50	0.550	1.242	0.683	
Rear	LTE 25	20	17	Ant A	1905.00	26590	QPSK	1	0	15mm	24.33	25.20	0.639	1.222	0.781	
Rear	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	15mm	22.62	23.50	0.424	1.225	0.519	
Rear	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	1	0	15mm	23.06	24.00	0.577	1.242	0.717	
Cell Phone+ LED Cover																
Rear	LTE 71	20	2	Ant A	680.50	133297	QPSK	1	50	15mm	25.18	25.80	0.218	1.153	0.251	A9
Rear	LTE 12	10	68	Ant A	707.50	23095	QPSK	1	0	15mm	24.63	25.80	0.223	1.309	0.292	
Rear	LTE 13	10	0	Ant A	782.00	23230	QPSK	1	49	15mm	24.29	25.80	0.249	1.416	0.353	
Rear	LTE 14	10	1	Ant A	793.00	23330	QPSK	1	49	15mm	24.81	25.50	0.240	1.172	0.281	
Rear	LTE 26	15	4	Ant A	831.50	26865	QPSK	1	0	15mm	24.59	25.80	0.268	1.321	0.354	
Rear	LTE 5	10	4	Ant A	836.50	20525	QPSK	1	25	15mm	24.60	25.80	0.271	1.318	0.357	
Rear	LTE 66	20	16	Ant A	1720.00	132072	QPSK	1	0	15mm	24.56	25.50	0.366	1.242	0.455	
Rear	LTE 25	20	17	Ant A	1905.00	26590	QPSK	1	0	15mm	24.33	25.20	0.578	1.222	0.706	
Rear	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	1	0	15mm	22.62	23.50	0.359	1.225	0.440	
Rear	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	1	0	15mm	23.06	24.00	0.390	1.242	0.484	

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				
Cell Phone																
Rear	LTE 41	1 CC Uplink	20	N/A	2549.50	40185	QPSK	1	0	15mm	27.14	28.20	0.694	1.276	0.886	A10
Cell Phone+ LED Cover																
Rear	LTE 41	1 CC Uplink	20	N/A	2549.50	40185	QPSK	1	0	15mm	27.14	28.20	0.407	1.276	0.519	A10

WLAN Body Worn SAR

EUT Position	Mode	Antenna	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					
Cell Phone												
Rear	802.11b	2	2437.00	6	15mm	20.24	21.00	0.084	1.191	1.010	0.101	A11
Rear	802.11a	2	5260.00	52	15mm	16.95	18.00	0.362	1.274	1.012	0.467	
Rear	802.11a	2	5720.00	144	15mm	17.35	17.50	0.286	1.035	1.012	0.300	
Rear	802.11a	2	5785.00	157	15mm	17.26	17.50	0.229	1.057	1.012	0.245	
Cell Phone+ LED Cover												
Rear	802.11b	2	2437.00	6	15mm	20.24	21.00	0.065	1.191	1.010	0.078	A11
Rear	802.11a	2	5260.00	52	15mm	16.95	18.00	0.338	1.274	1.012	0.436	
Rear	802.11a	2	5720.00	144	15mm	17.35	17.50	0.274	1.035	1.012	0.287	
Rear	802.11a	2	5785.00	157	15mm	17.26	17.50	0.176	1.057	1.012	0.188	

NII MIMO Body worn SAR

EUT Position	Mode	Antenna	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					
Cell Phone														
Rear	802.11n	MIMO	5320.0	64	15mm	17.21	18.00	16.89	18.00	0.528	1.291	1.014	0.691	A12
Cell Phone+ LED Cover														
Rear	802.11n	MIMO	5320.0	64	15mm	17.21	18.00	16.89	18.00	0.499	1.291	1.014	0.653	A12

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					
Cell Phone												
Rear	Bluetooth	FHSS	2480.00	78	15mm	16.50	16.50	0.036	1.000	1.294	0.047	A13
Cell Phone+ LED Cover												
Rear	Bluetooth	FHSS	2480.00	78	15mm	16.50	16.50	0.019	1.000	1.294	0.025	A13

20.3 Hotspot SAR data

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				
Cell Phone												
Rear	GSM 850	GPRS 4TX	N/A	848.80	251	10mm	27.14	28.50	0.561	1.368	0.767	A14
Bottom	GSM 1900	GPRS 3TX	N/A	1880.00	661	10mm	22.99	23.80	0.441	1.205	0.531	
Rear	UMTS 850	RMC	0	846.60	4233	10mm	25.14	25.80	0.747	1.164	0.870	
Bottom	UMTS 1750	RMC	16	1752.60	1513	10mm	19.60	20.50	0.690	1.230	0.849	
Bottom	UMTS 1900	RMC	17	1907.60	9538	10mm	19.27	20.50	0.964	1.327	1.279	
Rear	CDMA BC10	EVDO Rev.0	0	820.10	564	10mm	25.54	26.00	0.668	1.112	0.743	
Rear	CDMA BC0	EVDO Rev.0	0	848.31	777	10mm	24.86	26.00	0.748	1.300	0.972	
Bottom	PCS CDMA	EVDO Rev.0	17	1908.75	1175	10mm	19.95	21.00	0.972	1.274	1.238	
Cell Phone+ LED Cover												
Rear	GSM 850	GPRS 4TX	N/A	848.80	251	10mm	27.14	28.50	0.240	1.368	0.328	A14
Bottom	GSM 1900	GPRS 3TX	N/A	1880.00	661	10mm	22.99	23.80	0.474	1.205	0.571	
Rear	UMTS 850	RMC	0	846.60	4233	10mm	25.14	25.80	0.501	1.164	0.583	
Bottom	UMTS 1750	RMC	16	1752.60	1513	10mm	19.60	20.50	0.660	1.230	0.812	
Bottom	UMTS 1900	RMC	17	1907.60	9538	10mm	19.27	20.50	0.883	1.327	1.172	
Rear	CDMA BC10	EVDO Rev.0	0	820.10	564	10mm	25.54	26.00	0.413	1.112	0.459	
Rear	CDMA BC0	EVDO Rev.0	0	848.31	777	10mm	24.86	26.00	0.469	1.300	0.610	
Bottom	PCS CDMA	EVDO Rev.0	17	1908.75	1175	10mm	19.95	21.00	0.952	1.274	1.213	

LTE FDD Hotspot SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna	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				
Cell Phone																
Rear	LTE 71	20	2	N/A	680.50	133297	QPSK	1	50	10mm	25.18	25.80	0.422	1.153	0.487	A15
Rear	LTE 12	10	68	N/A	707.50	23095	QPSK	1	0	10mm	24.63	25.80	0.452	1.309	0.592	
Rear	LTE 13	10	0	N/A	782.00	23230	QPSK	1	49	10mm	24.29	25.80	0.529	1.416	0.749	
Rear	LTE 14	10	1	N/A	793.00	23330	QPSK	1	49	10mm	24.81	25.50	0.620	1.172	0.727	
Rear	LTE 26	15	4	N/A	831.50	26865	QPSK	1	0	10mm	24.59	25.80	0.683	1.321	0.902	
Rear	LTE 5	10	4	N/A	836.50	20525	QPSK	1	25	10mm	24.60	25.80	0.735	1.318	0.969	
Bottom	LTE 66	20	16	N/A	1720.00	132072	QPSK	1	0	10mm	19.52	21.00	0.622	1.406	0.875	
Bottom	LTE 25	20	17	N/A	1905.00	26590	QPSK	100	0	10mm	19.37	20.50	0.799	1.297	1.036	
Bottom	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	50	0	10mm	20.42	21.00	0.783	1.143	0.895	
Bottom	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	50	0	10mm	19.41	20.50	0.993	1.285	1.276	
Cell Phone+ LED Cover																
Rear	LTE 71	20	2	N/A	680.50	133297	QPSK	1	50	10mm	25.18	25.80	0.315	1.153	0.363	A15
Rear	LTE 12	10	68	N/A	707.50	23095	QPSK	1	0	10mm	24.63	25.80	0.327	1.309	0.428	
Rear	LTE 13	10	0	N/A	782.00	23230	QPSK	1	49	10mm	24.29	25.80	0.341	1.416	0.483	
Rear	LTE 14	10	1	N/A	793.00	23330	QPSK	1	49	10mm	24.81	25.50	0.366	1.172	0.429	
Rear	LTE 26	15	4	N/A	831.50	26865	QPSK	1	0	10mm	24.59	25.80	0.423	1.321	0.559	
Rear	LTE 5	10	4	N/A	836.50	20525	QPSK	1	25	10mm	24.60	25.80	0.419	1.318	0.552	
Bottom	LTE 66	20	16	N/A	1720.00	132072	QPSK	1	0	10mm	19.52	21.00	0.593	1.406	0.834	
Bottom	LTE 25	20	17	N/A	1905.00	26590	QPSK	100	0	10mm	19.37	20.50	0.836	1.297	1.084	
Bottom	LTE 30	10	N/A	Ant B	2310.00	27710	QPSK	50	0	10mm	20.42	21.00	0.848	1.143	0.969	
Bottom	LTE 7	20	N/A	Ant B	2560.00	21350	QPSK	50	0	10mm	19.41	20.50	0.982	1.285	1.262	

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				
Cell Phone																
Rear	LTE 41	2 CC Uplink	20	PCC	2593.00	40620	QPSK	1	0	10mm	21.19	22.50	0.880	1.352	1.190	A16
				SCC	2573.20	40422	QPSK	1	99							
Cell Phone + LED Cover																
Rear	LTE 41	2 CC Uplink	20	PCC	2593.00	40620	QPSK	1	0	10mm	21.19	22.50	0.885	1.352	1.197	A16
				SCC	2573.20	40422	QPSK	1	99							

WLAN Hotspot SAR

EUT Position	Mode	Antenna	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					
Cell Phone												
Top	802.11b	2	2437.00	6	10mm	20.24	21.00	0.310	1.191	1.010	0.372	A17
Rear	802.11a	1	5785.0	157	10mm	16.70	17.50	0.195	1.202	1.013	0.237	
Rear	802.11a	2	5785.00	157	10mm	17.26	17.50	0.398	1.057	1.012	0.426	
Cell Phone + LED Cover												
Top	802.11b	2	2437.00	6	10mm	20.24	21.00	0.183	1.191	1.010	0.220	A17
Rear	802.11a	1	5785.0	157	10mm	16.70	17.50	0.149	1.202	1.013	0.181	
Rear	802.11a	2	5785.00	157	10mm	17.26	17.50	0.203	1.057	1.012	0.217	

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						
Cell Phone											
Front	FHSS	2480.00	78	16.50	16.50	10mm	0.104	1.000	1.294	0.135	A18
Cell Phone+ LED Cover											
Front	FHSS	2480.00	78	16.50	16.50	10mm	0.048	1.000	1.294	0.062	A18

20.4 Phablet SAR data

GSM/UMTS/CDMA Phablet SAR

EUT Position	Mode	Service	Ant State	Traffic Channel		Spacing	Power(dBm)		10-g SAR (W/kg)	Scaling Factor (Power)	10-g Scaled SAR (W/kg)	Plot No
				Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit				
Cell Phone												
Bottom	GSM 1900	GPRS 3TX	N/A	1850.20	512	0mm	22.96	23.80	1.260	1.213	1.528	A19
Bottom	UMTS 1750	RMC	16	1712.40	1312	0mm	20.68	22.00	2.280	1.355	3.089	
Rear	UMTS 1750	RMC	16	1732.40	1412	0mm	20.81	22.00	1.440	1.315	1.894	
Bottom	UMTS 1900	RMC	17	1880.00	9400	0mm	19.42	20.50	2.390	1.282	3.064	
Rear	UMTS 1900	RMC	17	1880.00	9400	0mm	19.42	20.50	1.420	1.282	1.820	
Bottom	PCS CDMA	EVDO Rev.0	17	1908.75	1175	0mm	19.95	21.00	2.420	1.274	3.083	
Rear	PCS CDMA	EVDO Rev.0	17	1880.00	600	0mm	19.99	21.00	1.550	1.262	1.956	
Cell Phone+ LED Cover												
Bottom	GSM 1900	GPRS 3TX	N/A	1850.20	512	0mm	22.96	23.80	1.190	1.213	1.443	A19
Bottom	UMTS 1750	RMC	16	1712.40	1312	0mm	20.68	22.00	2.300	1.355	3.117	
Rear	UMTS 1750	RMC	16	1732.40	1412	0mm	20.81	22.00	1.100	1.315	1.447	
Bottom	UMTS 1900	RMC	17	1880.00	9400	0mm	19.42	20.50	2.230	1.282	2.859	
Rear	UMTS 1900	RMC	17	1880.00	9400	0mm	19.42	20.50	1.050	1.282	1.346	
Bottom	PCS CDMA	EVDO Rev.0	17	1908.75	1175	0mm	19.95	21.00	2.430	1.274	3.096	
Rear	PCS CDMA	EVDO Rev.0	17	1880.00	600	0mm	19.99	21.00	0.977	1.262	1.233	

LTE FDD Phablet SAR

EUT Position	Mode	Bandwidth (MHz)	Ant State	Antenna	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		10-g SAR (W/kg)	Scaling Factor (Power)	10-g Scaled SAR (W/kg)	Plot No
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Cell Phone																
Bottom	LTE 66	20	16	N/A	1720.00	132072	QPSK	50	0	0mm	20.68	22.00	2.340	1.355	3.171	A20
Rear	LTE 66	20	16	N/A	1745.00	132322	QPSK	50	0	0mm	20.81	22.00	1.390	1.315	1.828	
Bottom	LTE 25	20	17	N/A	1905.00	26590	QPSK	1	0	0mm	19.51	20.50	2.330	1.256	2.926	
Rear	LTE 25	20	17	N/A	1905.00	26590	QPSK	50	0	0mm	19.46	20.50	1.410	1.271	1.792	
Bottom	LTE 7	20	N/A	Ant B	2510.00	20850	QPSK	1	0	0mm	19.38	21.00	1.940	1.452	2.817	
Rear	LTE 7	20	N/A	Ant B	2535.00	21100	QPSK	50	0	0mm	19.40	21.00	1.230	1.445	1.777	
Rear	LTE 30	10	N/A	Ant A	2310.00	27710	QPSK	25	0	0mm	21.58	22.50	1.670	1.236	2.064	
Cell Phone+ LED Cover																
Bottom	LTE 66	20	16	N/A	1720.00	132072	QPSK	50	0	0mm	20.68	22.00	2.290	1.355	3.103	A20
Rear	LTE 66	20	16	N/A	1745.00	132322	QPSK	50	0	0mm	20.81	22.00	1.060	1.315	1.394	
Bottom	LTE 25	20	17	N/A	1905.00	26590	QPSK	1	0	0mm	19.51	20.50	2.340	1.256	2.939	
Rear	LTE 25	20	17	N/A	1905.00	26590	QPSK	50	0	0mm	19.46	20.50	1.050	1.271	1.335	
Bottom	LTE 7	20	N/A	Ant B	2510.00	20850	QPSK	1	0	0mm	19.38	21.00	1.930	1.452	2.802	
Rear	LTE 7	20	N/A	Ant B	2535.00	21100	QPSK	50	0	0mm	19.40	21.00	0.750	1.445	1.084	
Rear	LTE 30	10	N/A	Ant A	2310.00	27710	QPSK	25	0	0mm	21.58	22.50	1.060	1.236	1.310	

LTE TDD Phablet SAR

EUT Position	Mode	Uplink	Bandwidth (MHz)	Component Carrier	Traffic Channel		Modulation	RB Size	RB offset	Spacing	Power(dBm)		10-g SAR (W/kg)	Scaling Factor (Power)	10-g Scaled SAR (W/kg)	Plot No
					Frequency (MHz)	Channel					Conducted Power	Tune-Up Limit				
Cell Phone																
Bottom	LTE 41	1 CC Uplink	20	N/A	2506.00	39750	QPSK	50	50	0mm	22.76	24.00	2.370	1.330	3.152	A21
Rear	LTE 41	1 CC Uplink	20	N/A	2506.00	39750	QPSK	1	99	0mm	22.53	24.00	1.380	1.403	1.936	
Cell Phone+ LED Cover																
Bottom	LTE 41	1 CC Uplink	20	N/A	2506.00	39750	QPSK	50	50	0mm	22.76	24.00	2.190	1.330	2.913	A21
Rear	LTE 41	1 CC Uplink	20	N/A	2506.00	39750	QPSK	1	99	0mm	22.53	24.00	0.866	1.403	1.215	

WLAN Phablet SAR

EUT Position	Mode	Antenna	Traffic Channel		Spacing	Power(dBm)		10-g SAR (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty cycle)	10-g Scaled SAR (W/kg)	Plot No
			Frequency (MHz)	Channel		Conducted Power	Tune-Up Limit					
Cell Phone												
Rear	802.11a	2	5300.00	60	0mm	16.92	18.00	1.440	1.282	1.012	1.868	A22
Rear	802.11a	2	5720.00	144	0mm	17.35	17.50	1.160	1.035	1.012	1.215	
Cell Phone+ LED Cover												
Rear	802.11a	2	5300.00	60	0mm	16.92	18.00	0.856	1.282	1.012	1.111	A22
Rear	802.11a	2	5720.00	144	0mm	17.35	17.50	0.744	1.035	1.012	0.779	

20.5 Simultaneous Transmission Scenario for Head SAR

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.45GHz MIMO at 16 dBm SAR (W/kg)	5GHz Ant 1 SAR (W/kg)	5GHz Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Cell Phone						
Head	GSM 850	0.220	0.924	0.038	0.297	1.479
	GSM 1900	0.079	0.924	0.038	0.297	1.338
	UMTS 850	0.303	0.924	0.038	0.297	1.562
	UMTS 1750	0.149	0.924	0.038	0.297	1.408
	UMTS 1900	0.168	0.924	0.038	0.297	1.427
	CDMA BC10 (§90S)	0.235	0.924	0.038	0.297	1.494
	CDMA BC0 (§22H)	0.325	0.924	0.038	0.297	1.584
	PCS CDMA	0.144	0.924	0.038	0.297	1.403
	LTE Band 71	0.156	0.924	0.038	0.297	1.415
	LTE Band 12	0.192	0.924	0.038	0.297	1.451
	LTE Band 13	0.280	0.924	0.038	0.297	1.539
	LTE Band 14	0.211	0.924	0.038	0.297	1.470
	LTE Band 26 (Cell)	0.269	0.924	0.038	0.297	1.528
	LTE Band 5 (Cell)	0.302	0.924	0.038	0.297	1.561
	LTE Band 66 (AWS)	0.122	0.924	0.038	0.297	1.381
	LTE Band 25 (PCS)	0.178	0.924	0.038	0.297	1.437
	LTE Band 30	0.147	0.924	0.038	0.297	1.406
	LTE Band 7	0.130	0.924	0.038	0.297	1.389
	LTE Band 41	0.107	0.924	0.038	0.297	1.366
Cell Phone+ LED Cover						
Head	GSM 850	0.155	0.503	0.025	0.108	0.791
	GSM 1900	0.052	0.503	0.025	0.108	0.688
	UMTS 850	0.228	0.503	0.025	0.108	0.864
	UMTS 1750	0.144	0.503	0.025	0.108	0.780
	UMTS 1900	0.159	0.503	0.025	0.108	0.795
	CDMA BC10 (§90S)	0.215	0.503	0.025	0.108	0.851
	CDMA BC0 (§22H)	0.240	0.503	0.025	0.108	0.876
	PCS CDMA	0.140	0.503	0.025	0.108	0.776
	LTE Band 71	0.149	0.503	0.025	0.108	0.785
	LTE Band 12	0.177	0.503	0.025	0.108	0.813
	LTE Band 13	0.191	0.503	0.025	0.108	0.827
	LTE Band 14	0.152	0.503	0.025	0.108	0.788
	LTE Band 26 (Cell)	0.201	0.503	0.025	0.108	0.837
	LTE Band 5 (Cell)	0.232	0.503	0.025	0.108	0.868
	LTE Band 66 (AWS)	0.137	0.503	0.025	0.108	0.773
	LTE Band 25 (PCS)	0.154	0.503	0.025	0.108	0.790
	LTE Band 30	0.137	0.503	0.025	0.108	0.773
	LTE Band 7	0.123	0.503	0.025	0.108	0.759
	LTE Band 41	0.092	0.503	0.025	0.108	0.728

20.6 Simultaneous Transmission Scenario for Body Worn

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Cell Phone				
Body Worn	GSM 850	0.305	0.691	0.996
	GSM 1900	0.325	0.691	1.016
	UMTS 850	0.449	0.691	1.140
	UMTS 1750	0.722	0.691	1.413
	UMTS 1900	0.771	0.691	1.462
	CDMA BC10 (§90S)	0.402	0.691	1.093
	CDMA BC0 (§22H)	0.479	0.691	1.170
	PCS CDMA	0.730	0.691	1.421
	LTE Band 71	0.317	0.691	1.008
	LTE Band 12	0.343	0.691	1.034
	LTE Band 13	0.449	0.691	1.140
	LTE Band 14	0.397	0.691	1.088
	LTE Band 26 (Cell)	0.416	0.691	1.107
	LTE Band 5 (Cell)	0.448	0.691	1.139
	LTE Band 66 (AWS)	0.683	0.691	1.374
	LTE Band 25 (PCS)	0.781	0.691	1.472
	LTE Band 30	0.519	0.691	1.210
	LTE Band 7	0.717	0.691	1.408
	LTE Band 41	0.886	0.691	1.577
Cell Phone+ LED Cover				
Body Worn	GSM 850	0.233	0.653	0.886
	GSM 1900	0.233	0.653	0.886
	UMTS 850	0.347	0.653	1.000
	UMTS 1750	0.622	0.653	1.275
	UMTS 1900	0.647	0.653	1.300
	CDMA BC10 (§90S)	0.330	0.653	0.983
	CDMA BC0 (§22H)	0.382	0.653	1.035
	PCS CDMA	0.599	0.653	1.252
	LTE Band 71	0.251	0.653	0.904
	LTE Band 12	0.292	0.653	0.945
	LTE Band 13	0.353	0.653	1.006
	LTE Band 14	0.281	0.653	0.934
	LTE Band 26 (Cell)	0.354	0.653	1.007
	LTE Band 5 (Cell)	0.357	0.653	1.010
	LTE Band 66 (AWS)	0.455	0.653	1.108
	LTE Band 25 (PCS)	0.706	0.653	1.359
	LTE Band 30	0.440	0.653	1.093
	LTE Band 7	0.484	0.653	1.137
	LTE Band 41	0.519	0.653	1.172

20.7 Simultaneous Transmission Scenario for Hotspot SAR

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Cell Phone				
Hotspot	GSM 850	0.767	0.237	1.004
	GSM 1900	0.531	0.237	0.768
	UMTS 850	0.870	0.237	1.107
	UMTS 1750	0.849	0.237	1.086
	UMTS 1900	1.279	0.237	1.516
	CDMA BC10 (§90S)	0.735	0.237	0.972
	CDMA BC0 (§22H)	0.972	0.237	1.209
	PCS CDMA	1.238	0.237	1.475
	LTE Band 71	0.487	0.237	0.724
	LTE Band 12	0.592	0.237	0.829
	LTE Band 13	0.749	0.237	0.986
	LTE Band 14	0.727	0.237	0.964
	LTE Band 26 (Cell)	0.902	0.237	1.139
	LTE Band 5 (Cell)	0.969	0.237	1.206
	LTE Band 66 (AWS)	0.875	0.237	1.112
	LTE Band 25 (PCS)	1.036	0.237	1.273
	LTE Band 30	0.895	0.237	1.132
	LTE Band 7	1.276	0.237	1.513
	LTE Band 41	1.190	0.237	1.427
	Cell Phone+ LED Cover			
Hotspot	GSM 850	0.328	0.181	0.509
	GSM 1900	0.571	0.181	0.752
	UMTS 850	0.583	0.181	0.764
	UMTS 1750	0.812	0.181	0.993
	UMTS 1900	1.172	0.181	1.353
	CDMA BC10 (§90S)	0.459	0.181	0.640
	CDMA BC0 (§22H)	0.610	0.181	0.791
	PCS CDMA	1.213	0.181	1.394
	LTE Band 71	0.363	0.181	0.544
	LTE Band 12	0.428	0.181	0.609
	LTE Band 13	0.483	0.181	0.664
	LTE Band 14	0.429	0.181	0.610
	LTE Band 26 (Cell)	0.559	0.181	0.740
	LTE Band 5 (Cell)	0.552	0.181	0.733
	LTE Band 66 (AWS)	0.834	0.181	1.015
	LTE Band 25 (PCS)	1.084	0.181	1.265
	LTE Band 30	0.969	0.181	1.150
	LTE Band 7	1.262	0.181	1.443
	LTE Band 41	1.197	0.181	1.378

20.8 Simultaneous Transmission Scenario for Phablet SAR

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Cell Phone				
Phablet SAR	UMTS 1750	3.089	1.868	See Table Below
	PCS EVDO	3.083	1.868	See Table Below
	GPRS 1900	1.528	1.868	3.396
	UMTS 1900	3.064	1.868	See Table Below
	LTE Band 66 (AWS)	3.171	1.868	See Table Below
	LTE Band 25 (PCS)	2.926	1.868	See Table Below
	LTE Band 30	2.064	1.868	3.932
	LTE Band 7	2.817	1.868	See Table Below
	LTE Band 41	3.152	1.868	See Table Below
Cell Phone+ LED Cover				
Phablet SAR	UMTS 1750	3.117	1.111	See Table Below
	PCS EVDO	3.096	1.111	See Table Below
	GPRS 1900	1.443	1.111	2.554
	UMTS 1900	2.859	1.111	3.970
	LTE Band 66 (AWS)	3.103	1.111	See Table Below
	LTE Band 25 (PCS)	2.939	1.111	See Table Below
	LTE Band 30	1.310	1.111	2.421
	LTE Band 7	2.802	1.111	3.913
	LTE Band 41	2.913	1.111	See Table Below

Cell Phone Table									
Simult Tx	Configuration	UMTS 1750	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
Phablet SAR	Back	1.894	1.868	3.762	Phablet SAR	Back	1.956	1.868	3.824
	Bottom	3.089	Not required	3.089		Bottom	3.083	Not required	3.083
	Configuration	UMTS 1900	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		Configuration	LTE Band 66 (AWS)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
	Back	1.820	1.868	3.688		Back	1.828	1.868	3.696
	Bottom	3.064	Not required	3.064		Bottom	3.171	Not required	3.171
	Configuration	LTE Band 25 (PCS)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		Configuration	LTE Band 7	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
	Back	1.792	1.868	3.660		Back	1.777	1.868	3.645
	Bottom	2.926	Not required	2.926		Bottom	2.817	Not required	2.817
	Configuration	LTE Band 41	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		Configuration	LTE Band 7	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
	Back	1.936	1.868	3.804		Back	1.777	1.868	3.645
	Bottom	3.152	Not required	3.152		Bottom	2.817	Not required	2.817

Cell Phone+ LED Cover Table									
Simult Tx	Configuration	UMTS 1750	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
Phablet SAR	Back	1.447	1.111	2.558	Phablet SAR	Back	1.233	1.111	2.344
	Bottom	3.117	Not required	3.117		Bottom	3.096	Not required	3.096
	Configuration	UMTS 1900	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		Configuration	LTE Band 66 (AWS)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
	Back	1.346	1.111	2.457		Back	1.394	1.111	2.505
	Bottom	2.859	Not required	2.859		Bottom	3.103	Not required	3.103
	Configuration	LTE Band 25 (PCS)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		Configuration	LTE Band 7	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1 + 2			1	2	1 + 2
	Back	1.335	1.111	2.446		Back	1.084	1.111	2.195
	Bottom	2.939	Not required	2.939		Bottom	2.802	Not required	2.802
	Configuration	LTE Band 41	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)					
		1	2	1 + 2					
	Back	1.215	1.111	2.326					
	Bottom	2.913	Not required	2.913					

Note: Pre FCC KDB Publication 6458474 D04 Handset SAR v01r01, the devices edges with antennas more than 2.5 cm from edge are not required.

Appendixes List

Appendix A

- A.1 Verification Test Plots
- A.2 SAR Test Plots for GSM/UMTS/CDMA Head
- A.3 SAR Test Plots for LTE FDD Head
- A.4 SAR Test Plots for LTE TDD Head
- A.5 SAR Test Plots for WLAN Head
- A.6 SAR Test Plots for DTS MIMO Head
- A.7 SAR Test Plots for Bluetooth Head
- A.8 SAR Test Plots for GSM/UMTS/CDMA Body
- A.9 SAR Test Plots for LTE FDD Body Worn
- A.10 SAR Test Plots for LTE TDD Body Worn
- A.11 SAR Test Plots for WLAN Body Worn
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- A.17 SAR Test Plots for WLAN Hotspot
- A.18 SAR Test Plots for Bluetooth Hotspot
- A.19 SAR Test Plots for GSM/UMTS/CDMA Phablet
- A.20 SAR Test Plots for LTE FDD Phablet
- A.21 SAR Test Plots for LTE TDD Phablet
- A.22 SAR Test Plots for WLAN Phablet

Appendix B

- B.1 Calibration certificate for Probe
- B.2 Calibration certificate for DAE
- B.3 Calibration certificate for Dipole

Appendix A.1 Verification Test Plots

Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [750MHz Head Verification 2018_06_28.da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °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; $\sigma = 0.913$ S/m; $\epsilon_r = 43.056$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(11.55, 11.55, 11.55); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Head Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.06 W/kg

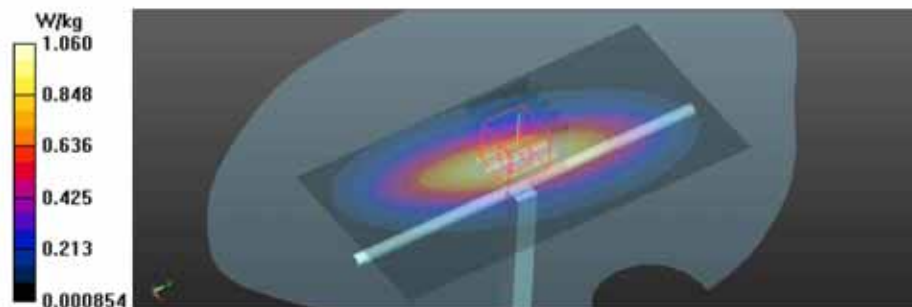
Verification/750MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.74 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.810 W/kg; SAR(10 g) = 0.544 W/kg

Maximum value of SAR (measured) = 1.06 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [750MHz Head Verification 2018_06_28\(2\).da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °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: $f = 750 \text{ MHz}$; $\sigma = 0.861 \text{ S/m}$; $\epsilon_r = 43.233$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(11.55, 11.55, 11.55); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Head Verification(2)/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.995 W/kg

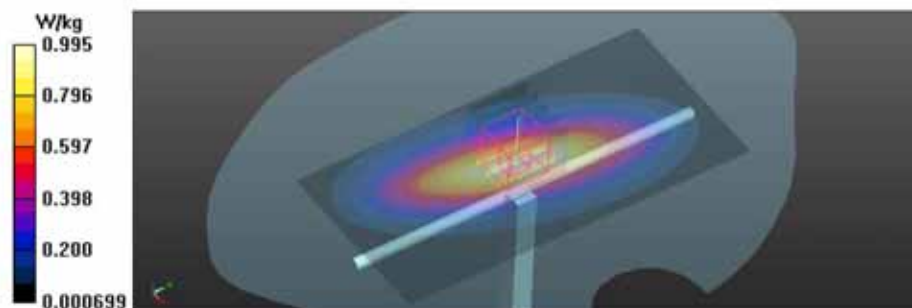
Verification/750MHz Head Verification(2)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.39 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.797 W/kg; SAR(10 g) = 0.536 W/kg

Maximum value of SAR (measured) = 1.04 W/kg



Date: 2018-06-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Body Verification 2018_06_29.da53.0

Input Power : 100 mW

Ambient Temp : 23.2 °C Tissue Temp : 22.2 °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: $f = 750 \text{ MHz}$; $\sigma = 0.999 \text{ S/m}$; $\epsilon_r = 54.677$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(11.34, 11.34, 11.34); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Body Verification/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 1.13 W/kg

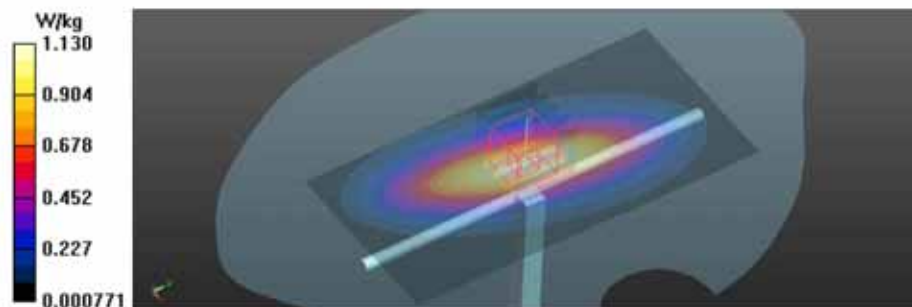
Verification/750MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 30.27 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.857 W/kg; SAR(10 g) = 0.578 W/kg

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



Date: 2018-06-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Body Verification 2018_06_29(2).da53:0

Input Power : 100 mW

Ambient Temp : 23.2 °C Tissue Temp : 22.2 °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: $f = 750 \text{ MHz}$; $\sigma = 0.933 \text{ S/m}$; $\epsilon_r = 55.081$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(11.34, 11.34, 11.34); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/750MHz Body Verification(2)/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 1.03 W/kg

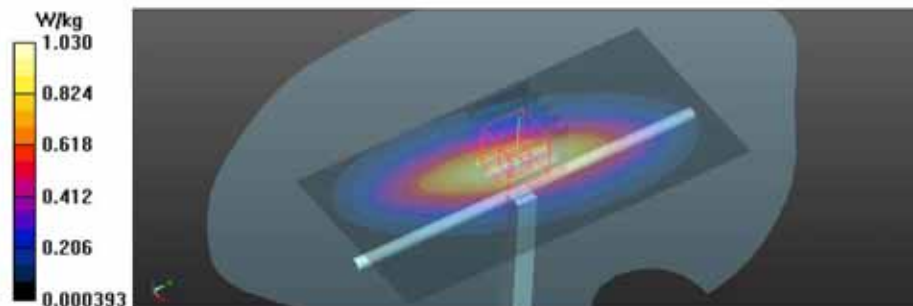
Verification/750MHz Body Verification(2)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 30.24 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.840 W/kg; SAR(10 g) = 0.565 W/kg

Maximum value of SAR (measured) = 1.09 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [835MHz Head Verification 2018_06_28.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

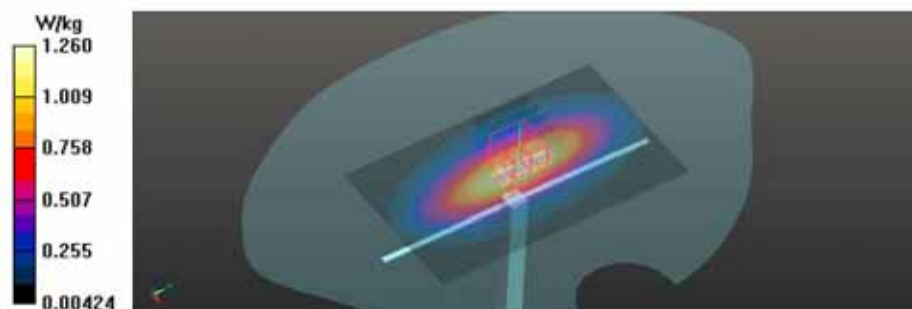
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.92$ S/m; $\epsilon_r = 40.665$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/835MHz Head Verification/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.26 W/kg

Verification/835MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.92 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.954 W/kg; SAR(10 g) = 0.629 W/kg
Maximum value of SAR (measured) = 1.27 W/kg



Date: 2018-06-30

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [835MHz Body Verification 2018_06_30.da53-0](#)

Input Power : 100 mW

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

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

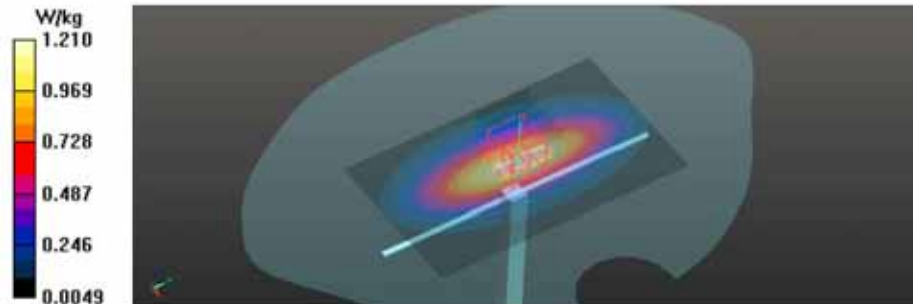
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.974 \text{ S/m}$; $\epsilon_r = 55.003$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.83, 10.83, 10.83); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/835MHz Head Verification/Area Scan (61x101x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 1.21 W/kg

Verification/835MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 36.34 V/m; Power Drift = 0.01 dB
 Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.910 W/kg; SAR(10 g) = 0.603 W/kg
 Maximum value of SAR (measured) = 1.20 W/kg



Date: 2018-07-05

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1750MHz Head Verification 2018_07_05_da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °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; $\sigma = 1.399$ S/m; $\epsilon_r = 38.676$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(9.13, 9.13, 9.13); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- 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) = 5.56 W/kg

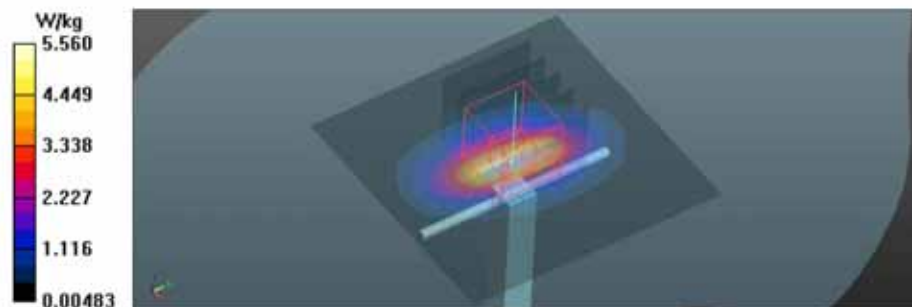
Verification/1750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 65.58 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 6.41 W/kg

SAR(1 g) = 3.7 W/kg; SAR(10 g) = 1.99 W/kg

Maximum value of SAR (measured) = 5.52 W/kg



Date: 2018-07-05

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [1750MHz Body Verification 2018_07_05.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °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; $\sigma = 1.488$ S/m; $\epsilon_r = 55.249$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.87, 8.87, 8.87); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- 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) = 5.36 W/kg

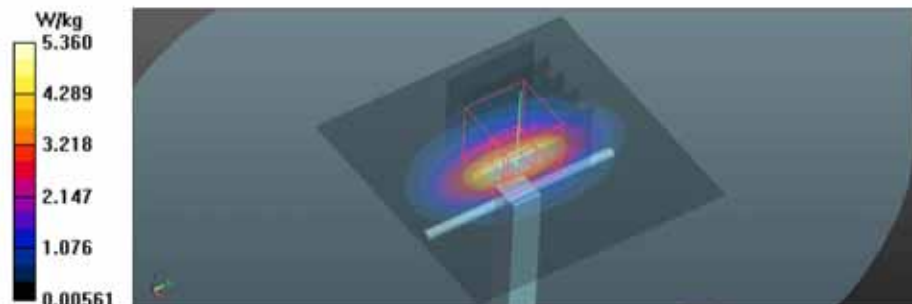
Verification/1750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 62.27 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 6.18 W/kg

SAR(1 g) = 3.55 W/kg; SAR(10 g) = 1.91 W/kg

Maximum value of SAR (measured) = 5.33 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1900MHz Head Verification 2018_06_28.da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °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; $\sigma = 1.395$ S/m; $\epsilon_r = 39.158$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1900MHz Head Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.23 W/kg

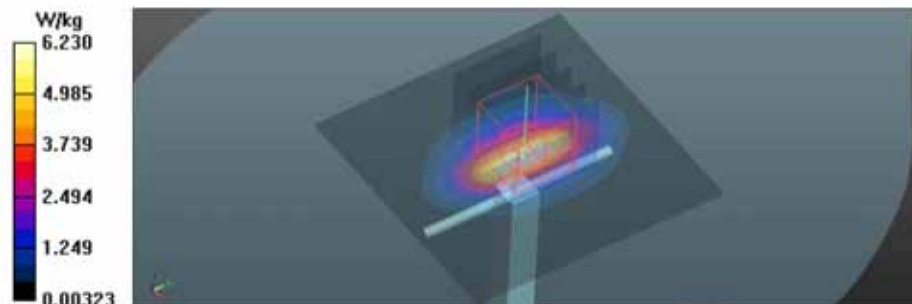
Verification/1900MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 68.80 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 7.25 W/kg

SAR(1 g) = 4.07 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 6.21 W/kg



Date: 2018-07-03

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [1900MHz Body Verification 2018_07_03.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.4 °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; $\sigma = 1.535$ S/m; $\epsilon_r = 53.326$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.39, 8.39, 8.39); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/1900MHz Body Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.27 W/kg

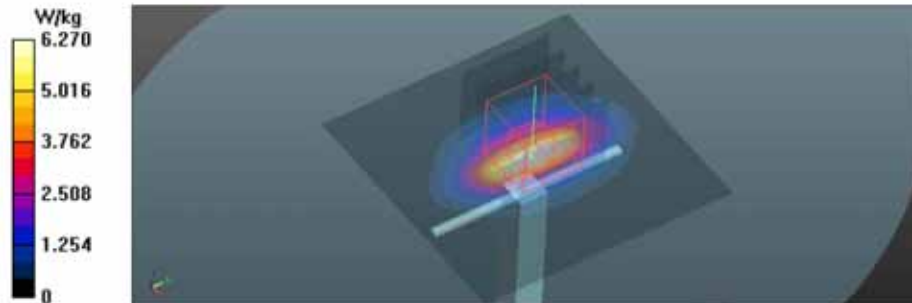
Verification/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 66.30 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 7.29 W/kg

SAR(1 g) = 4.12 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 6.27 W/kg



Date: 2018-07-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2300MHz Head Verification 2018_07_11_da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.3 °C

DUT: Dipole 2300 MHz D2300V2; Type: D2300V3; Serial: D2300V3 - SN:1037

Communication System: UID 0, CW (0); Frequency: 2300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2300$ MHz; $\sigma = 1.618$ S/m; $\epsilon_r = 38.462$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3933; ConvF(8.34, 8.34, 8.34); Calibrated: 2017-09-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2300 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 7.25 W/kg

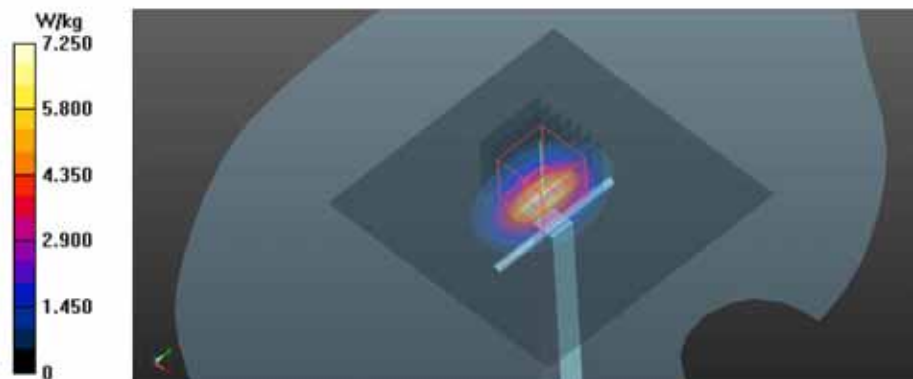
Verification/2300 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 69.62 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 9.84 W/kg

SAR(1 g) = 4.81 W/kg; SAR(10 g) = 2.29 W/kg

Maximum value of SAR (measured) = 7.93 W/kg



Date: 2018-07-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2300MHz Body Verification 2018_07_11.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.1 °C

DUT: Dipole 2300 MHz D2300V2; Type: D2300V3; Serial: D2300V3 - SN:1037

Communication System: UID 0, CW (0); Frequency: 2300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2300$ MHz; $\sigma = 1.776$ S/m; $\epsilon_r = 52.934$; $\rho = 1000$ 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 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2300 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.93 W/kg

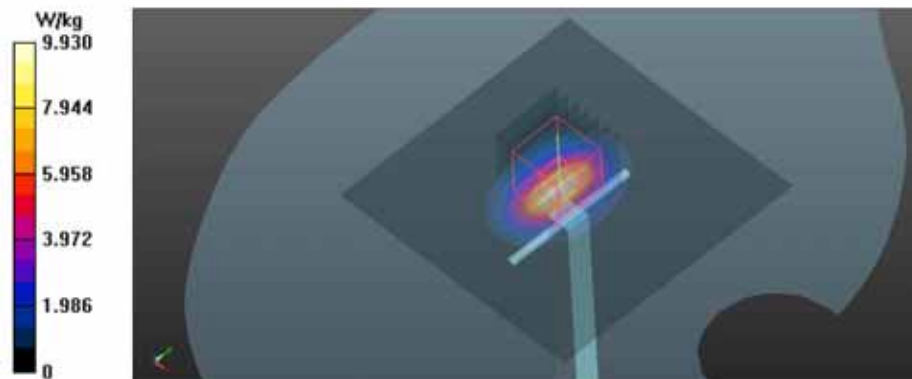
Verification/2300 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 70.13 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 9.56 W/kg

SAR(1 g) = 4.82 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 7.87 W/kg



Date: 2018-07-07

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Head Verification 2018_07_07_da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 22.5 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.798$ S/m; $\epsilon_r = 38.19$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.98, 7.98, 7.98); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 8.39 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

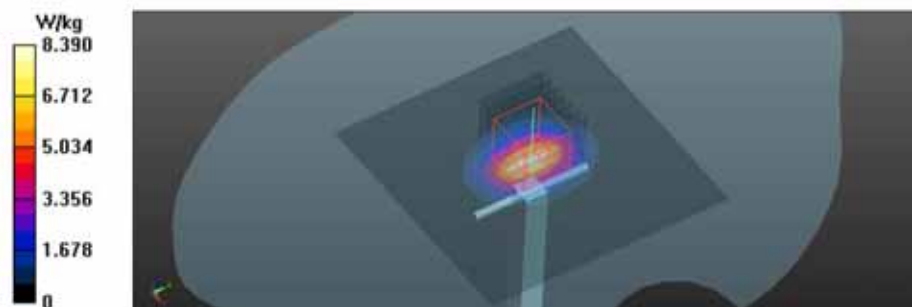
Reference Value = 71.86 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 10.2 W/kg

SAR(1 g) = 5.19 W/kg; SAR(10 g) = 2.51 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 8.43 W/kg



Date: 2018-07-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Head Verification 2018_07_11.da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.3 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.769$ S/m; $\epsilon_r = 38.051$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.98, 7.98, 7.98); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 7.65 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

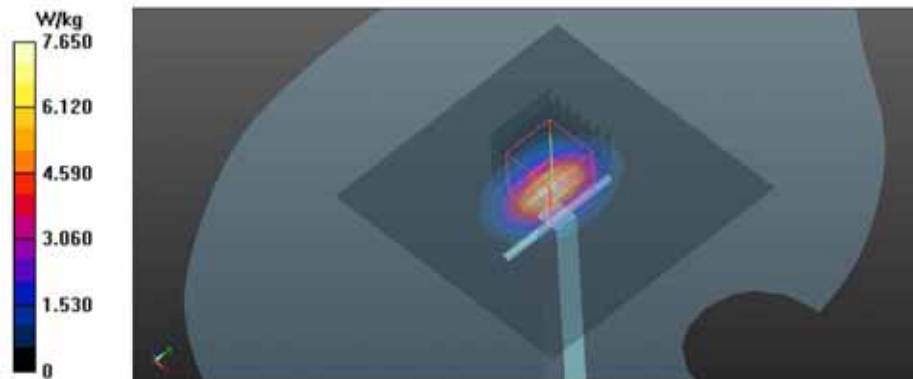
Reference Value = 69.80 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 10.3 W/kg

SAR(1 g) = 5.13 W/kg; SAR(10 g) = 2.46 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 8.40 W/kg



Date: 2018-07-16

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Head Verification 2018_07_16.da53.0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 22.1 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.787$ S/m; $\epsilon_r = 38.088$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

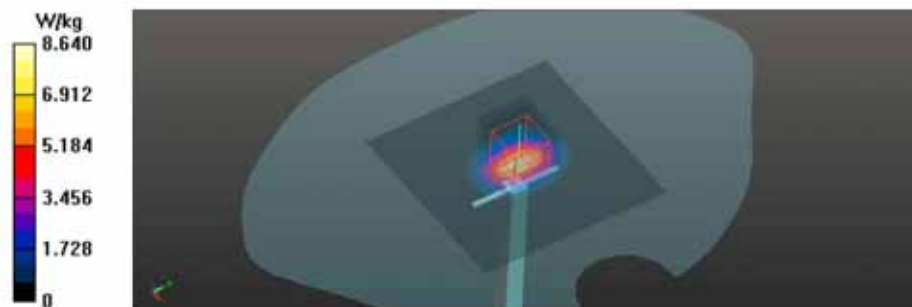
- Probe: EX3DV4 - SN3986; ConvF(7.98, 7.98, 7.98); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 8.64 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 71.25 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.38 W/kg; SAR(10 g) = 2.59 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 8.81 W/kg



Date: 2018-07-07

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Body Verification 2018_07_07.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 22.5 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.967$ S/m; $\epsilon_r = 51.848$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.99, 7.99, 7.99); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 9.37 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

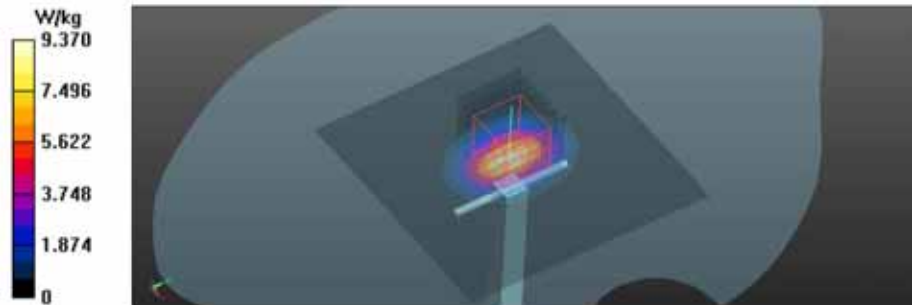
Reference Value = 66.89 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 10.4 W/kg

SAR(1 g) = 5.2 W/kg; SAR(10 g) = 2.5 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 8.51 W/kg



Date: 2018-07-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2450MHz Body Verification 2018_07_11.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.1 °C

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.932$ S/m; $\epsilon_r = 52.592$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.99, 7.99, 7.99); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0 TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2450 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 6.12 W/kg

Verification/2450 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

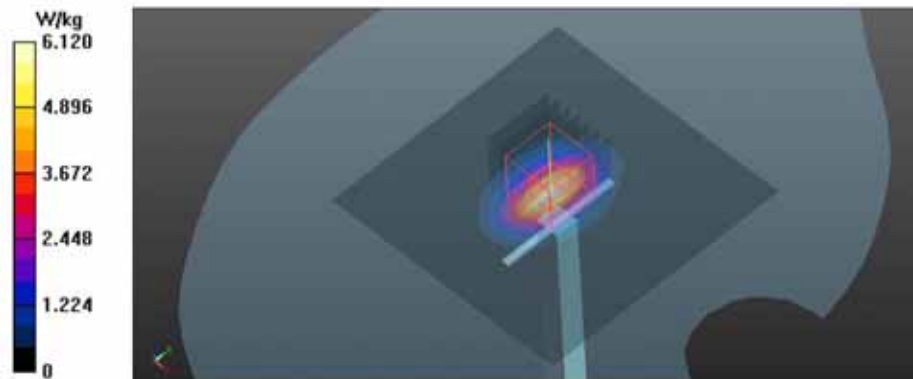
Reference Value = 64.03 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 9.47 W/kg

SAR(1 g) = 4.72 W/kg; SAR(10 g) = 2.25 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 7.74 W/kg



Date: 2018-07-10

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [2600MHz Head Verification 2018_07_10.da53-0](#)

Input Power : 100 mW

Ambient Temp : 23.2 °C Tissue Temp : 22.5 °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; $\sigma = 2.042$ S/m; $\epsilon_r = 38.129$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.7, 7.7, 7.7); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2600 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
 Maximum value of SAR (interpolated) = 8.71 W/kg

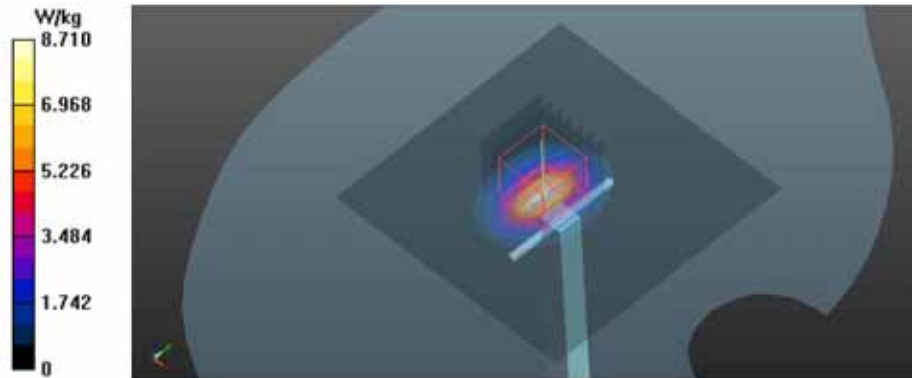
Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 66.04 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 12.0 W/kg

SAR(1 g) = 5.57 W/kg; SAR(10 g) = 2.49 W/kg

Maximum value of SAR (measured) = 9.58 W/kg



Date: 2018-07-10

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [2600MHz Body Verification 2018_07_10.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.2 °C Tissue Temp : 21.9 °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; $\sigma = 2.237$ S/m; $\epsilon_r = 51.436$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.85, 7.85, 7.85); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2600 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
 Maximum value of SAR (interpolated) = 9.80 W/kg

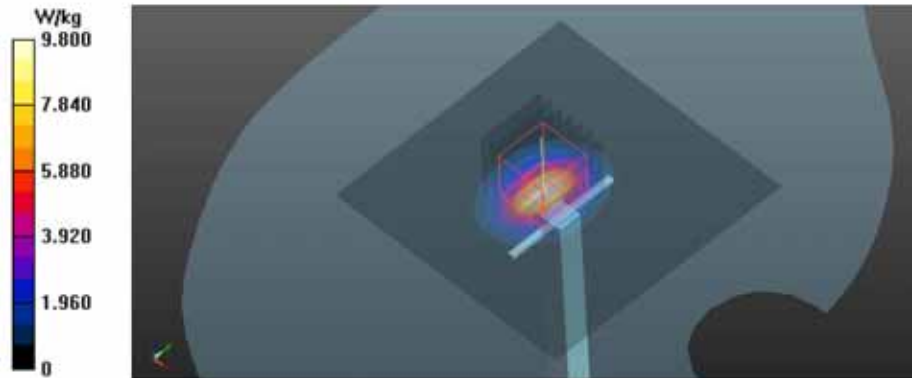
Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 63.23 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 12.5 W/kg

SAR(1 g) = 5.68 W/kg; SAR(10 g) = 2.53 W/kg

Maximum value of SAR (measured) = 9.85 W/kg



Date: 2018-07-20

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [2600MHz Body Verification 2018_07_20.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.8 °C Tissue Temp : 22.5 °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; $\sigma = 2.21$ S/m; $\epsilon_r = 51.843$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(7.85, 7.85, 7.85); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/2600 MHz Verification/Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.90 W/kg

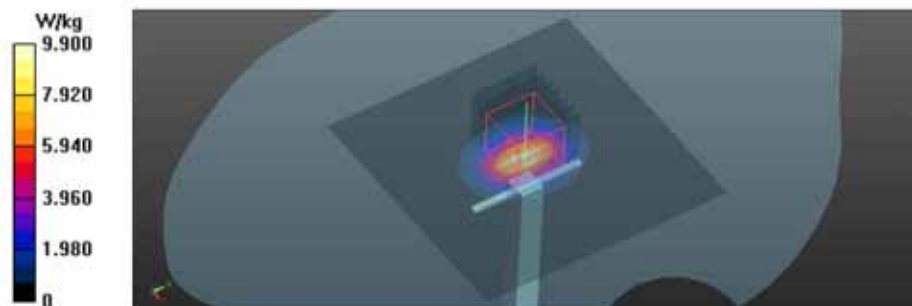
Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 67.45 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 12.8 W/kg

SAR(1 g) = 5.66 W/kg; SAR(10 g) = 2.51 W/kg

Maximum value of SAR (measured) = 9.97 W/kg



Date: 2018-07-12

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [5300MHz Head Verification 2018_07_12.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 22.2 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

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

Medium parameters used (interpolated): $f = 5300$ MHz; $\sigma = 4.758$ S/m; $\epsilon_r = 34.535$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(5.2, 5.2, 5.2); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5300MHz Verification/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 19.8 W/kg

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

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

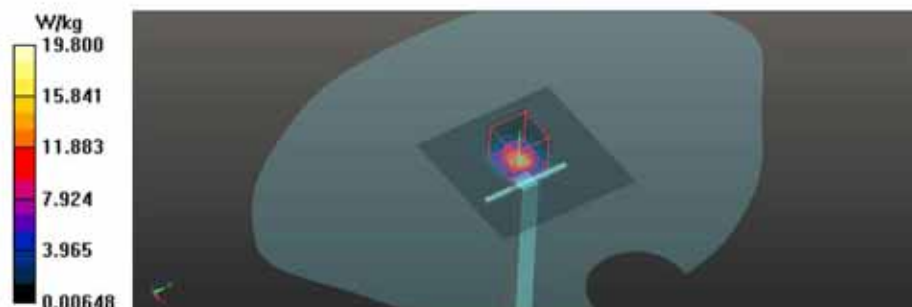
Reference Value = 63.57 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.23 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

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



Date: 2018-07-12

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5600MHz Head Verification 2018_07_12.da53:0

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 22.2 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

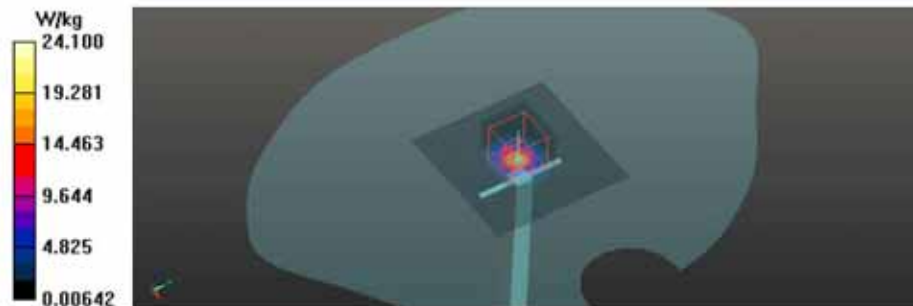
Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5600$ MHz; $\sigma = 4.964$ S/m; $\epsilon_r = 34.464$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(4.94, 4.94, 4.94); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5600MHz Verification/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm,
dy=1.000 mm
Maximum value of SAR (interpolated) = 24.1 W/kg

Verification/5600MHz Verification/Zoom Scan (8x8x7)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.58 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 38.5 W/kg
SAR(1 g) = 8.7 W/kg; SAR(10 g) = 2.46 W/kg
Maximum value of SAR (measured) = 22.8 W/kg



Date: 2018-07-13

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5800MHz Head Verification 2018_07_13.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

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

Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.147 \text{ S/m}$; $\epsilon_r = 34.153$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(4.91, 4.91, 4.91); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5800MHz Verification/Area Scan (81x81x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 22.2 W/kg

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

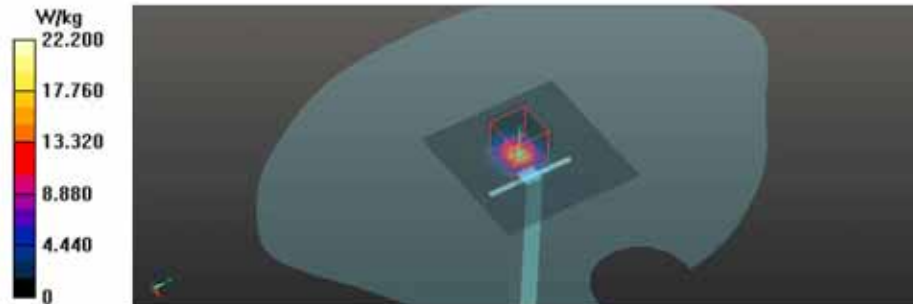
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 57.52 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 38.2 W/kg

SAR(1 g) = 8.35 W/kg; SAR(10 g) = 2.36 W/kg

Maximum value of SAR (measured) = 22.3 W/kg



Date: 2018-07-12

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [5300MHz Body Verification 2018_07_12_da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

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

Medium parameters used (interpolated): $f = 5300$ MHz; $\sigma = 5.359$ S/m; $\epsilon_r = 49.417$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(4.58, 4.58, 4.58); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5300MHz Verification/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 20.4 W/kg

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

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

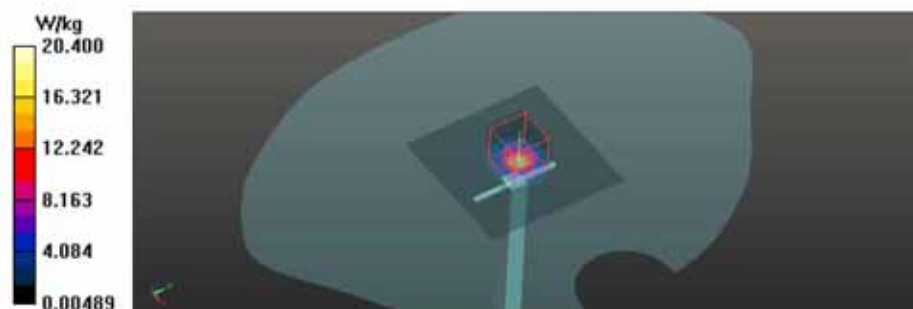
Reference Value = 67.13 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 29.6 W/kg

SAR(1 g) = 7.93 W/kg; SAR(10 g) = 2.26 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 19.6 W/kg



Date: 2018-07-12

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5600MHz Body Verification 2018_07_12.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

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

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.606$ S/m; $\epsilon_r = 47.352$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(4.09, 4.09, 4.09); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5600MHz Verification/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 21.6 W/kg

Verification/5600MHz Verification/Zoom Scan (8x8x7)/Cube 0: Measurement grid:

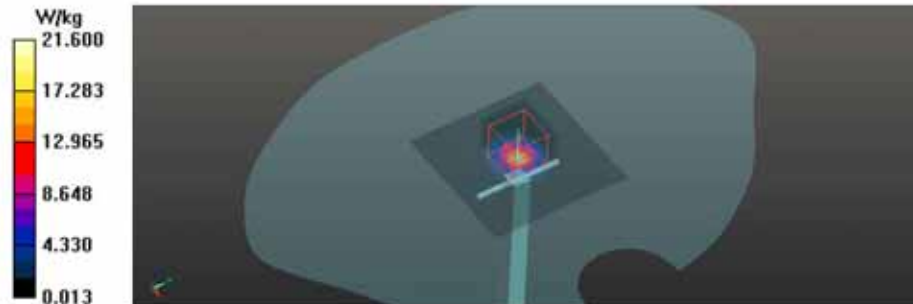
dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.69 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 34.3 W/kg

SAR(1 g) = 8.62 W/kg; SAR(10 g) = 2.42 W/kg

Maximum value of SAR (measured) = 21.6 W/kg



Date: 2018-07-13

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [5800MHz Body Verification 2018_07_13.da53:0](#)

Input Power : 100 mW

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

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

Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.932 \text{ S/m}$; $\epsilon_r = 46.227$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(4.24, 4.24, 4.24); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Verification/5800MHz Verification/Area Scan (81x81x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

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

Verification/5800MHz Verification/Zoom Scan (8x8x7)/Cube 0: Measurement grid:

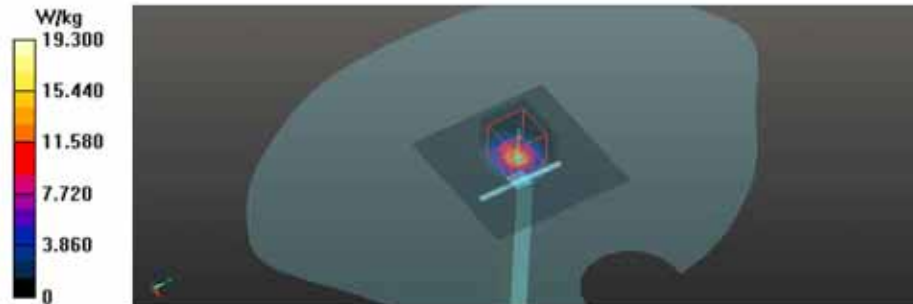
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 60.21 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 35.1 W/kg

SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.2 W/kg

Maximum value of SAR (measured) = 20.6 W/kg



Appendix A.2 SAR Test Plots for GSM/UMTS/CDMA Head

Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 850_Right Touch_CH190.da53:0

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

Communication System: UID 0, GSM850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM 850_Right Touch_CH190/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.224 W/kg

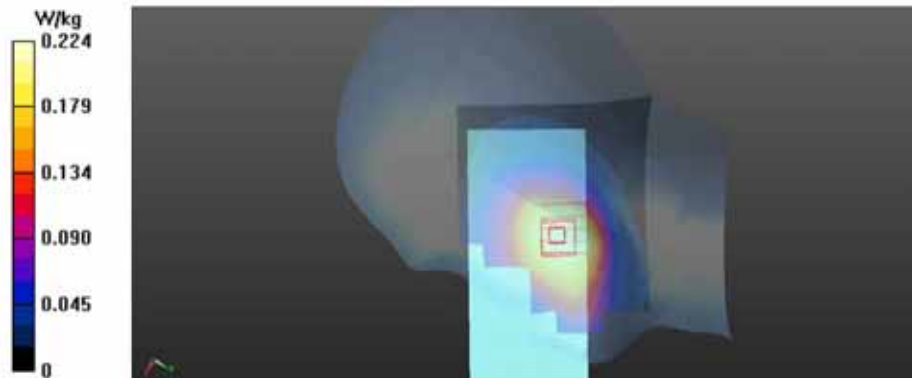
Head/GSM 850_Right Touch_CH190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.553 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.241 W/kg

SAR(1 g) = 0.188 W/kg; SAR(10 g) = 0.146 W/kg

Maximum value of SAR (measured) = 0.222 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: GSM 1900_Left Touch_CH661.da53:0

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

Communication System: UID 0, GSM1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP V5.0_TP-1720; Type: SAM; Serial: TP-1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM 1900_Left Touch_CH661/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0888 W/kg

Head/GSM 1900_Left Touch_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

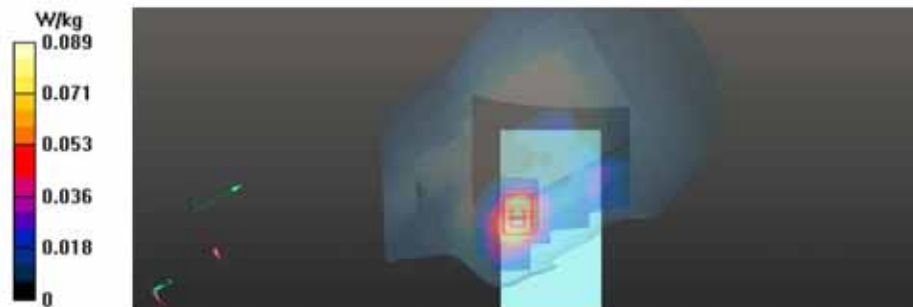
dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.464 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.103 W/kg

SAR(1 g) = 0.067 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.0910 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 850_Right Touch_CH4183.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 850_Right Touch_CH4183/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.320 W/kg

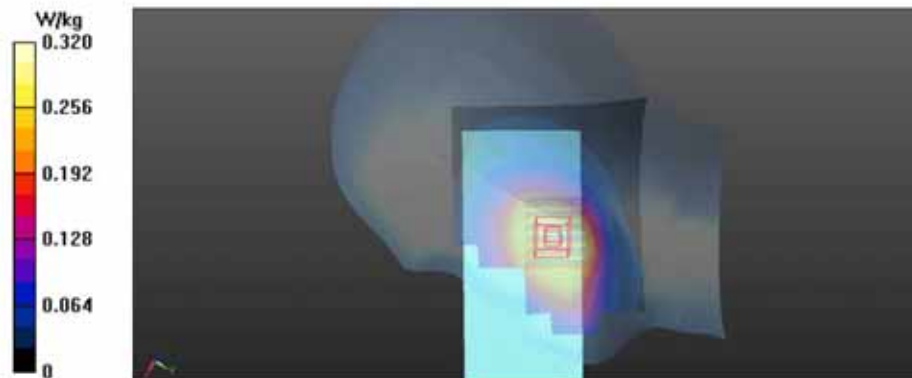
Head/UMTS 850_Right Touch_CH4183/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.689 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.342 W/kg

SAR(1 g) = 0.262 W/kg; SAR(10 g) = 0.203 W/kg

Maximum value of SAR (measured) = 0.312 W/kg



Date: 2018-07-05

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 1750_Left Touch_CH1412_da53-0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

Communication System: UID 0, WCDMA4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.382$ S/m; $\epsilon_r = 38.718$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(9.13, 9.13, 9.13); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1750_Left Touch_CH1412/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) = 0.135 W/kg

Head/UMTS 1750_Left Touch_CH1412/Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.257 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.173 W/kg

SAR(1 g) = 0.118 W/kg; SAR(10 g) = 0.078 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.147 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [UMTS 1900_Left Touch_CH9400.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP V5.0_TP-1720; Type: SAM; Serial: TP-1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1900_Left Touch_CH9400/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.209 W/kg

Head/UMTS 1900_Left Touch_CH9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

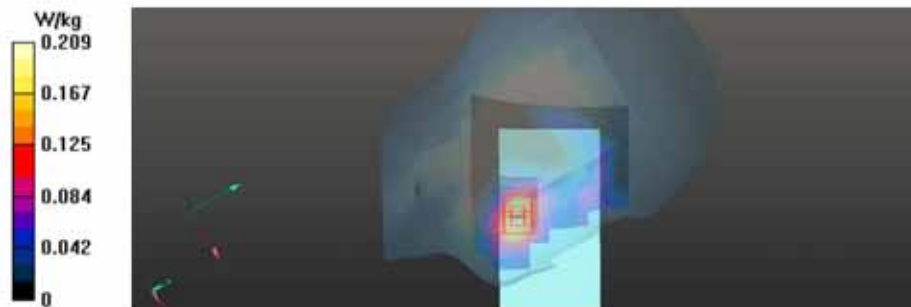
dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.053 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.088 W/kg

Maximum value of SAR (measured) = 0.198 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
 File Name: [CDMA DCN_EVDO_REV.A_Right Touch_CH564.da53-0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

Communication System: UID 0, CDMA DCN (0); Frequency: 820.1 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 820.1$ MHz; $\sigma = 0.908$ S/m; $\epsilon_r = 40.814$; $\rho = 1000$ kg/m³
 Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA DCN_EVDO_REV.A_Right Touch_CH564/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) = 0.251 W/kg

Head/CDMA DCN_EVDO_REV.A_Right Touch_CH564/Zoom Scan (6x6x7)/Cube 0:

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

Reference Value = 7.304 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.209 W/kg; SAR(10 g) = 0.165 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.245 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: CDMA DCN_RC3_SO55_Right Touch_CH384 da53-0

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U; Type: SPortable Handset; Serial: R38K40917LP

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

Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA DCN_RC3_SO55_Right Touch_CH384/Area Scan (81x101x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.295 W/kg

Head/CDMA DCN_RC3_SO55_Right Touch_CH384/Zoom Scan (5x5x7)/Cube 0:

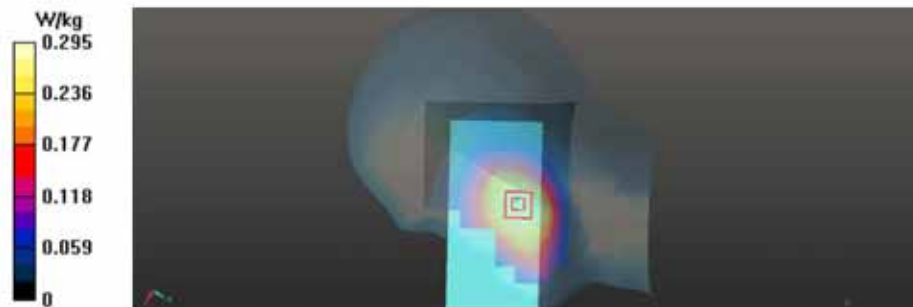
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.530 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.318 W/kg

SAR(1 g) = 0.248 W/kg; SAR(10 g) = 0.193 W/kg

Maximum value of SAR (measured) = 0.296 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA PCS_Left Touch_CH600.da53.0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U; Type: Portable Handset; Serial: R38K40917LP

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA PCS_Left Touch_CH600/Area Scan (81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.178 W/kg

Head/CDMA PCS_Left Touch_CH600/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

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

Reference Value = 5.186 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.212 W/kg

SAR(1 g) = 0.127 W/kg; SAR(10 g) = 0.077 W/kg

Maximum value of SAR (measured) = 0.182 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 850_Right Touch_CH190_With Cover.da53:0

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

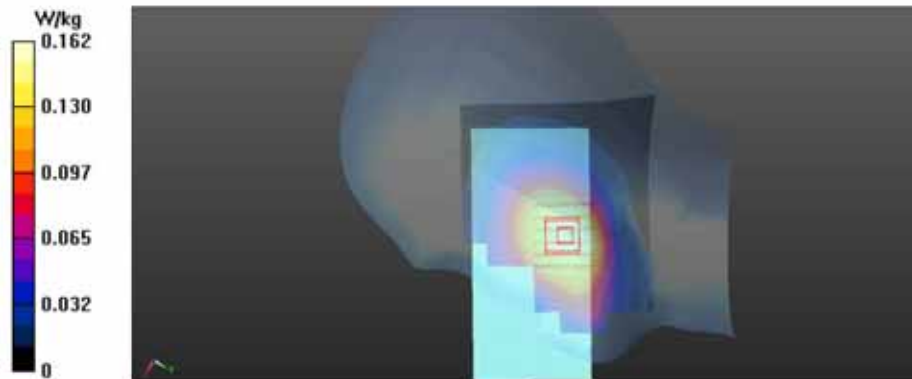
Communication System: UID 0, GSM850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM 850_Right Touch_CH190_With Cover/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.162 W/kg

Head/GSM 850_Right Touch_CH190_With Cover/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 5.134 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.176 W/kg
SAR(1 g) = 0.132 W/kg; SAR(10 g) = 0.104 W/kg
Maximum value of SAR (measured) = 0.158 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 1900_Left Touch_CH661_With Cover.da53:0

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

Communication System: UID 0, GSM1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP V5.0_TP-1720; Type: SAM; Serial: TP-1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/GSM 1900_Left Touch_CH661_With Cover/Area Scan (81x101x1): Interpolated
grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0998 W/kg

Head/GSM 1900_Left Touch_CH661_With Cover/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.382 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.0690 W/kg
SAR(1 g) = 0.044 W/kg; SAR(10 g) = 0.028 W/kg
Maximum value of SAR (measured) = 0.0603 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 850_Right Touch_CH4183_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

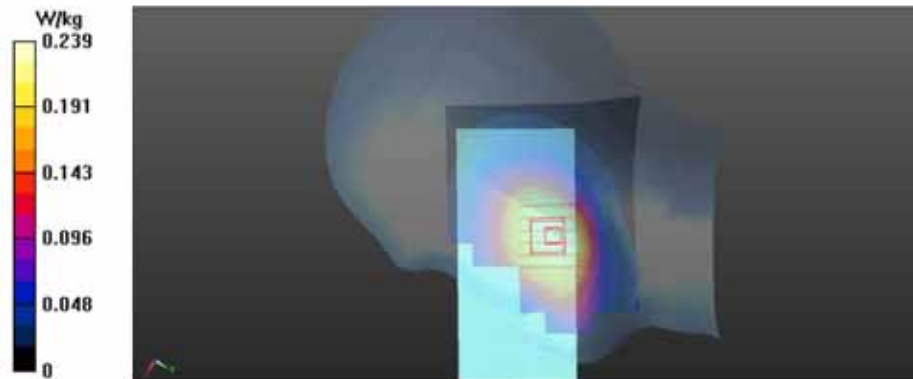
Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 850_Right Touch_CH4183_With Cover/Area Scan (81x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.239 W/kg

Head/UMTS 850_Right Touch_CH4183_With Cover/Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 6.532 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.260 W/kg
SAR(1 g) = 0.197 W/kg; SAR(10 g) = 0.156 W/kg
Maximum value of SAR (measured) = 0.234 W/kg



Date: 2018-07-05

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 1750_Left Touch_CH1412_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

Communication System: UID 0, WCDMA4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4 \text{ MHz}$; $\sigma = 1.382 \text{ S/m}$; $\epsilon_r = 38.718$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(9.13, 9.13, 9.13); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP v5.0_TP-1721; Type: QD000P40CD; Serial: TP-1721
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1750_Left Touch_CH1412_With Cover/Area Scan (81x101x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.159 W/kg

Head/UMTS 1750_Left Touch_CH1412_With Cover/Zoom Scan (6x5x7)/Cube 0: Measurement grid:

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

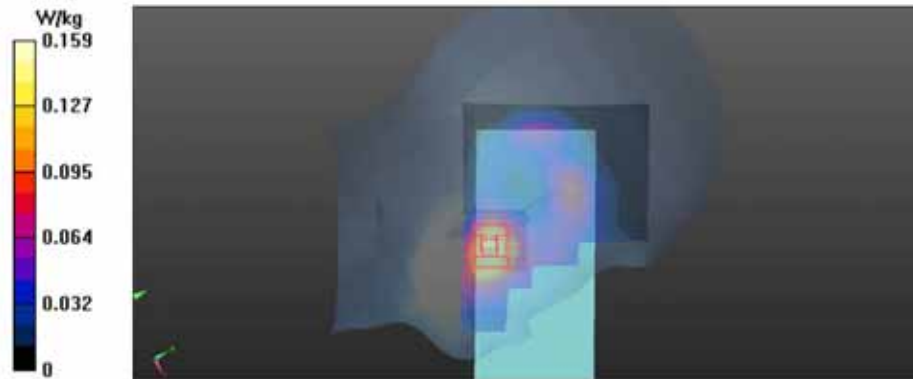
Reference Value = 7.330 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.168 W/kg

SAR(1 g) = 0.114 W/kg; SAR(10 g) = 0.076 W/kg

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.149 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: [UMTS 1900_Left Touch_CH9400_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

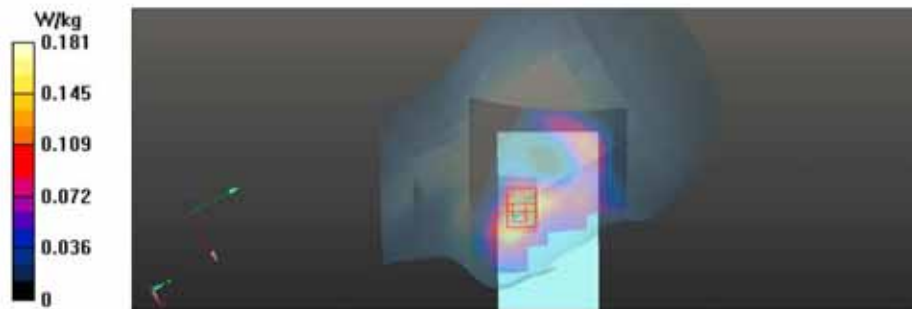
Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP V5.0_TP-1720; Type: SAM; Serial: TP-1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/UMTS 1900_Left Touch_CH9400_With Cover/Area Scan (81x101x1): Interpolated
grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.181 W/kg

Head/UMTS 1900_Left Touch_CH9400_With Cover/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.552 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.135 W/kg; SAR(10 g) = 0.082 W/kg
Maximum value of SAR (measured) = 0.188 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA DCN_EVDO_REV.A_Right Touch_CH564_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View CoverView Cover; Serial: R38K40917LP & R37K36R1MAXHB3

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

Medium parameters used (interpolated): $f = 820.1$ MHz; $\sigma = 0.908$ S/m; $\epsilon_r = 40.814$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA DCN_EVDO_REV.A_Right Touch_CH564_With Cover/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) = 0.223 W/kg

Head/CDMA DCN_EVDO_REV.A_Right Touch_CH564_With Cover/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

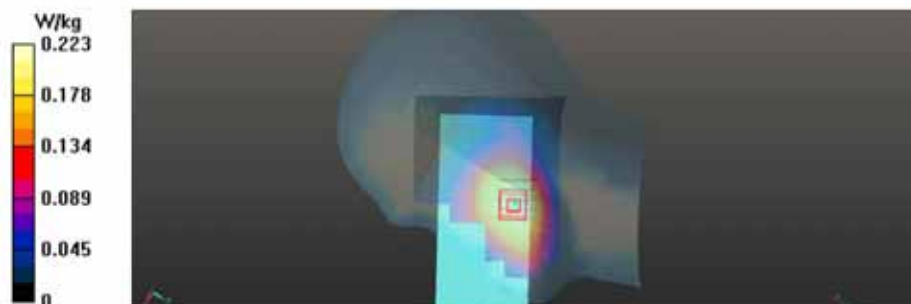
Reference Value = 6.745 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.243 W/kg

SAR(1 g) = 0.191 W/kg; SAR(10 g) = 0.151 W/kg

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.220 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA DCN_RC3_SO55_Right Touch_CH384_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.3 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

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

Medium parameters used: $f = 837$ MHz; $\sigma = 0.922$ S/m; $\epsilon_r = 40.642$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(10.88, 10.88, 10.88); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM Phantom TP-1645; Type: SAM Phantom; Serial: TP-1645
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA DCN_RC3_SO55_Right Touch_CH384_With Cover/Area Scan

(81x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.220 W/kg

Head/CDMA DCN_RC3_SO55_Right Touch_CH384_With Cover/Zoom Scan

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

Reference Value = 6.389 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.233 W/kg

SAR(1 g) = 0.183 W/kg; SAR(10 g) = 0.145 W/kg

Maximum value of SAR (measured) = 0.212 W/kg



Date: 2018-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)

File Name: [CDMA PCS_Left Touch_CH600_With Cover.da53:0](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.1 °C

DUT: SM-N960U & EF-NN960; Type: Portable Handset & LED View Cover; Serial: R38K40917LP & R37K36R1MAXHB3

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 39.245$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY52 Configuration:

- Probe: EX3DV4 - SN3986; ConvF(8.84, 8.84, 8.84); Calibrated: 2018-03-23;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 2018-03-16
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.0(1446)SEMCAD X 14.6.10(7417)

Head/CDMA PCS_Left Touch_CH600_With Cover/Area Scan (81x101x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.168 W/kg

Head/CDMA PCS_Left Touch_CH600_With Cover/Zoom Scan (5x5x7)/Cube 0:

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

Reference Value = 5.248 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.208 W/kg

SAR(1 g) = 0.124 W/kg; SAR(10 g) = 0.075 W/kg

Maximum value of SAR (measured) = 0.177 W/kg

