SAR TEST REPORT

HCT CO., LTD

EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
FCC ID:	ZNFD955
Model:	LG-D955
Additional Model:	LGD955, D955
Date of Issue:	Dec. 09, 2013
Test report No.:	HCTA1311FS03-02
Test Laboratory:	**HCT CO., LTD.** 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea TEL: +82 31 645 6300 FAX: +82 31 645 6401
Applicant :	**LG Electronics, MobileComm U.S.A., Inc.** 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
Testing has been carried out in accordance with:	RSS-102 Issue 4; Health Canada Safety Code 6 47CFR §2.1093 ANSI/ IEEE C95.1 – 1992 IEEE 1528-2003
Test result:	The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.
Signature	Report prepared by : Young –Soo Jang Test Engineer of SAR Part Approved by : Jae-Sang So Manager of SAR Part

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Revision History

Rev.	Issue DATE	DESCRIPTION
HCTA1311FS03	Nov. 28, 2013	Initial Issue
HCTA1311FS03-01	Dec. 05, 2013	Sec. 11.4.1 : revised Test exclusion table.
		Sec. 13.2-3 : revised Measurement Results (WLAN Hotspot SAR) Table.
		Sec. 15.1 : revised simultaneous transmission summation for head table.
		Sec. 15.3 : changed simultaneous transmission summation 5 GHz wifi table title.
HCTA1311FS03-02	Dec.09,2013	Sec.11.4.1 : recalculated in test exclusion table
		Sec. 15.1 : revised typo in simultaneous transmission summation for head table.

1. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). 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 NCRP, 1986, Bethesda, MD 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.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

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

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma E^2 / \rho$$

Where:
σ = conductivity of the tissue-simulant material (S/m)
ρ = mass density of the tissue-simulant material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB Procedure, IEEE Standard 1528-2003 & IEEE 1528a-2005 and the following published KDB procedures.

- FCC KDB Publication 941225 D01 SAR test for 3G devices v02
- FCC KDB Publication 941225 D02 HSPA and 1x Advanced v02r02
- FCC KDB Publication 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- FCC KDB Publication 941225 D06 Hot Spot SAR v01r01
- FCC KDB Publication 248227 D01v01r02(SAR Considerationa for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r01 (General SAR Guidance)
- FCC KDB Publication 648474 D04 Handset SAR v01r01
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r01
- FCC KDB Publication 865664 D02 SAR Reporting v01r01
- April 2013 TCB Workshop Notes (IEEE 802.11ac)

3. DESCRIPTION OF DEVICE

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

<table>
<tr><td>EUT Type</td><td colspan="6">Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID</td></tr>
<tr><td>FCC ID:</td><td colspan="6">ZNFD955</td></tr>
<tr><td>Model:</td><td colspan="6">LG-D955</td></tr>
<tr><td>Additional Model:</td><td colspan="6">LGD955, D955</td></tr>
<tr><td>Trade Name</td><td colspan="6">LG Electronics, MobileComm U.S.A., Inc.</td></tr>
<tr><td>Application Type</td><td colspan="6">Certification</td></tr>
<tr><td>Mode(s) of Operation</td><td colspan="6">GSM850 / GSM1900 / 802.11a/b/g/n/ac</td></tr>
<tr><td>Tx Frequency</td><td colspan="6">824.20 - 848.80 MHz (GSM850) / 1 850.20 – 1 909.80 MHz (GSM1900)
2 412- 2 462 MHz (802.11b/g/n/ac) / 5 180-5 825MHz(802.a/n/ac)</td></tr>
<tr><td>Production Unit or Identical Prototype</td><td colspan="6">Prototype</td></tr>
<tr><td rowspan="12">Max SAR</td><td rowspan="2">Band</td><td rowspan="2">Tx Frequency (MHz)</td><td rowspan="2">Equipment Class</td><td colspan="3">Reported 1g SAR (W/Kg)</td></tr>
<tr><td>Head</td><td>Body-worn</td><td>Hotspot</td></tr>
<tr><td>GSM850</td><td>824.2 - 848.8</td><td>PCE</td><td>0.21</td><td>0.24</td><td>0.39</td></tr>
<tr><td>GSM1900</td><td>1 850.2 -1 909.8</td><td>PCE</td><td>0.30</td><td>0.69</td><td>0.70</td></tr>
<tr><td>802.11b</td><td>2 412.0 - 2 462.0</td><td>DTS</td><td>0.30</td><td>0.16</td><td>0.16</td></tr>
<tr><td>802.11a</td><td>5 745 - 5 825</td><td>DTS</td><td>0.30</td><td>0.18</td><td>0.18</td></tr>
<tr><td>802.11a</td><td>5 180 - 5 240</td><td>UNII</td><td>0.16</td><td>0.11</td><td></td></tr>
<tr><td>802.11a</td><td>5 260 - 5 320</td><td>UNII</td><td>0.17</td><td>0.15</td><td></td></tr>
<tr><td>802.11a</td><td>5 500 - 5 700</td><td>UNII</td><td>0.29</td><td>0.22</td><td></td></tr>
<tr><td>Bluetooth</td><td>2 402 – 2 480</td><td>DSS/DTS</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="3">Simultaneous SAR per KDB 690783 D01</td><td>0.60</td><td>0.90</td><td>0.86</td></tr>
<tr><td colspan="6">Hand SAR for Phablet</td></tr>
<tr><td colspan="2">Band</td><td>Tx Frequency (MHz)</td><td>Equipment Class</td><td colspan="2">Reported 10g SAR (W/Kg)</td></tr>
<tr><td colspan="2">802.11a</td><td>5 180 - 5 240</td><td>UNII</td><td colspan="2">0.26</td></tr>
<tr><td colspan="2">802.11a</td><td>5 260 - 5 320</td><td>UNII</td><td colspan="2">0.29</td></tr>
<tr><td colspan="2">802.11a</td><td>5 500 - 5 700</td><td>UNII</td><td colspan="2">0.35</td></tr>
<tr><td>Date(s) of Tests</td><td colspan="6">Nov.12, 2013 ~ Nov.20, 2013</td></tr>
<tr><td>Antenna Type</td><td colspan="6">Integral Antenna</td></tr>
<tr><td>GPRS</td><td colspan="6">Multislot Class: 12</td></tr>
<tr><td>Key Feature(s)</td><td colspan="6">This device supports Mobile Hotspot.</td></tr>
</table>

Note : Separation distance of 0.8 mm was considered because this is the closest distance between the outer of the device and user. Please see the Operational description for further information.

4. DESCRIPTION OF TEST EQUIPMENT

4.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.3.1).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the HP Pentium IV 3.0 GHz computer with Windows XP system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

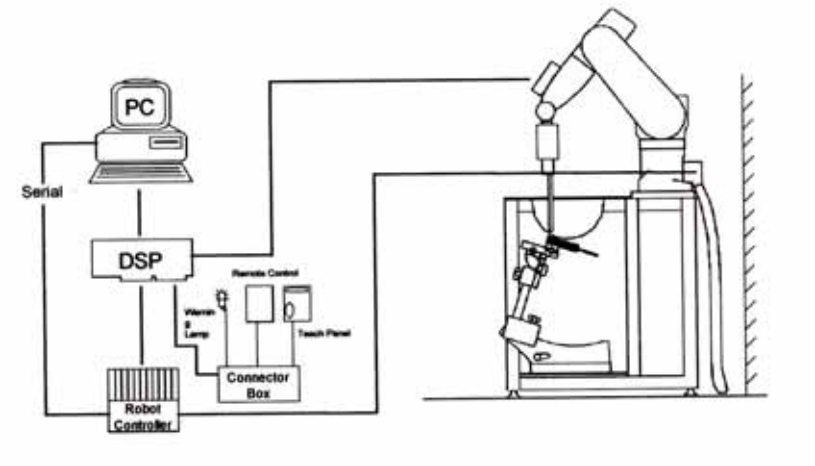


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

4.2 DASY E-FIELD PROBE SYSTEM

4.1 ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System Built-in shielding against static charges
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at Frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy: 8 %)
Frequency	10 MHz to > 3 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity	± 0.2 dB in brain tissue (rotation around probe axis) ± 0.4 dB in brain tissue (rotation normal probe axis)
Dynamic	5 μW/g to > 100 mW/g;
Range Linearity:	± 0.2 dB
Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces.
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dissymmetry up to 3 GHz Compliance tests of WCDMA/LTE Phones Fast automatic scanning in arbitrary phantoms

Figure 3. Photograph of the probe and the Phantom

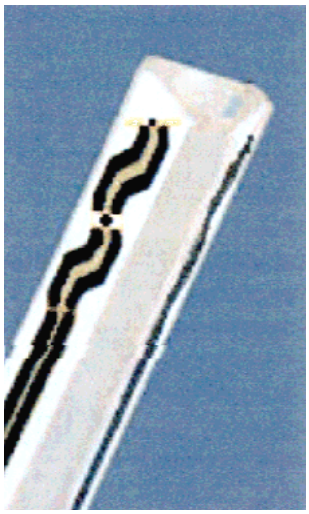


Figure 4. ET3DV6 E-field Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

4.2.1 EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors 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 900 and HSL 1810 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

Figure 5. Photograph of the probe and the Phantom

Figure 6. EX3DV4 E-field Probe

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

4.3 PROBE CALIBRATION PROCESS

4.3.1 E-Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with an accuracy better than ± 10 %. The spherical isotropy was evaluated with the proper procedure and found to be better than ± 0.25 dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.
The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

where:
Δt = exposure time (30 seconds),
C = heat capacity of tissue (brain or muscle),
ΔT = temperature increase due to RF exposure.
SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place.
Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

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

where:
σ = simulated tissue conductivity,
ρ = Tissue density (1.25 g/cm^3 for brain tissue)

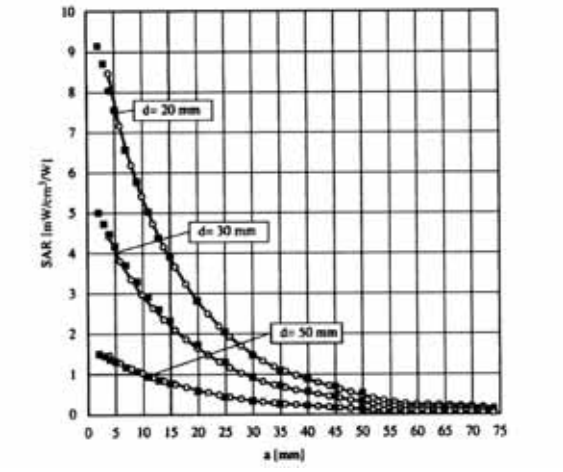


Figure 7. E-Field and Temperature measurements at 900 MHz

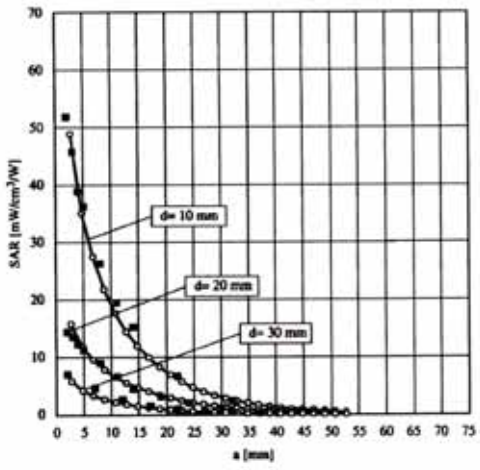


Figure 8. E-Field and temperature measurements at 1.8 GHz

4.3.2 Data Extrapolation

The DASY4 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = compensated signal of channel i (i=x,y,z)
U_i = input signal of channel i (i=x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with V_i = compensated signal of channel i (i = x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i = x,y,z)
$\mu V/(V/m)^2$ for E-field probes
ConvF = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermetian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in W/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with P_{pwe} = equivalent power density of a plane wave in W/cm^2
E_{tot} = total electric field strength in V/m

4.4 SAM Phantom

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. 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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Figure 9. SAM Phantom

Shell Thickness	2.0 mm ± 0.2 mm (6 ± 0.2 mm at ear point)
Filling Volume	about 25 L
Dimensions	810 mm x 1 000 mm x 500 mm (H x L x W)

Triple Modular Phantom consists of tree identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids. The MFP V5.1 will be delivered including wooden support only (**non**-standard SPEAG support).
Applicable for system performance check from 700 MHz to 6 GHz (MFP V5.1C) or 800 MHz - 6 GHz (MFP V5.1A) as well as dosimetric evaluations for body-worn operation.

Figure 10. MFP V5.1 Triple Modular Phantom

Shell Thickness	2.0 mm ± 0.2 mm
Filling Volume	approx. 9.2 L
Dimensions	830 mm x 500 mm (L x W)

4.5 Device Holder for Transmitters

In combination with the SAM Phantom V 4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 11. Device Holder

4.6 Tissue Simulating Mixture Characterization

The mixture is characterized to obtain proper dielectric constant (permittivity) and conductivity of the tissue of interest. The tissue dielectric parameters recommended in IEEE 1528 and IEC 62209 have been used as targets for the compositions, and are to mach within 5%, per the FCC recommendations .

Ingredients (% by weight)	Frequency (MHz)							
	835		1 900		2 450		5 200 - 5 800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body
Water	40.45	53.06	54.9	70.17	71.88	73.2	65.52	78.66
Salt (NaCl)	1.45	0.94	0.18	0.39	0.16	0.1	0.0	0.0
Sugar	57.0	44.9	0.0	0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	0.0	0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.0	0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	19.97	0.0	17.24	10.67
DGBE	0.0	0.0	44.92	29.44	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	17.24	10.67

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M 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		

Table 4.1 Composition of the Tissue Equivalent Matter

4.7 SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	SAM Phantom	-	N/A	N/A	N/A
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
Staubli	Robot RX90L	F01/5K09A1/A/01	N/A	N/A	N/A
Staubli	Robot ControllerCS7MB	F99/5A82A1/C/01	N/A	N/A	N/A
HP	Pavilion t000_puffer	KRJ51201TV	N/A	N/A	N/A
SPEAG	Light Alignment Sensor	265	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D221340.01	N/A	N/A	N/A
SPEAG	DAE4	648	Apr. 24, 2013	Annual	Apr. 24, 2014
SPEAG	E-Field Probe EX3DV6	1798	Apr. 29, 2013	Annual	Apr. 29, 2014
SPEAG	Dipole D835V2	441	Apr. 25, 2013	Annual	Apr. 25, 2014
SPEAG	Dipole D1900V2	5d032	Jul. 29, 2013	Annual	Jul. 29, 2014
SPEAG	Dipole D2450V2	743	Aug. 23, 2013	Annual	Aug. 23, 2014
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 01, 2013	Annual	Nov. 01, 2014
Agilent	Power Sensor(G) 8481	MY41090680	Oct. 30, 2013	Annual	Oct. 30, 2014
HP	Dielectric Probe Kit 85070C	00721521	CBT		
HP	Dual Directional Coupler 778D	16072	Oct. 31, 2013	Annual	Oct. 31, 2014
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2013	Annual	Feb. 10, 2014
HP	Signal Generator 8664A	3744A02069	Nov. 04, 2013	Annual	Nov. 04, 2014
Hewlett Packard	11636B/Power Divider	11377	Nov. 10. 2013	Annual	Nov. 11. 2014
Agilent	N9020A/ SIGNAL ANALYZER	MY51110020	Apr. 25, 2013	Annual	Apr. 25, 2014
TESCOM	TC-3000C / BLUETOOTH	3000C000276	Apr. 24, 2013	Annual	Apr. 24, 2014
HP	Network Analyzer 8753ES	JP39240221	Mar. 26, 2013	Annual	Mar. 26, 2014

NOTE:
1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the dielectric probe system and network analyzer to determine the conductivity and permittivity
(dielectric constant) of the brain/body-equivalent material.
2. CBT(Calibrating Before Testing). Prior to testing, the dielectric probe kit was calibrated via the network analyzer, with the specified procedure(calibrated in pure water) and calibration kit(standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent

5. SAR MEASUREMENT PROCEDURE

The evaluation was performed with the following procedure:

1. The SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drop.

2. The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15 mm x 15 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

3. Around this point, a volume of 32 mm x 32 mm x 30 mm was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:
   a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR value, at the same location as procedure #1, was re-measured. If the value changed by more than 5 %, the evaluation is repeated.

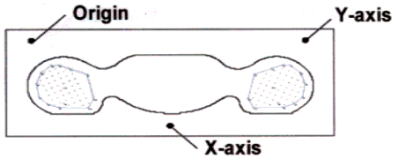


Figure 12. SAR Measurement Point in Area Scan

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s).
The measurement grid within an Area Scan is defined by the grid extend, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the hightest E-field value to determine the averaged SASR-distribution over 10g.
Area scan and zoom scan resolution setting follow KDB 865664 D01v01 quoted below

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
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 ≤ 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 1st 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	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

6. DESCRIPTION OF TEST POSITION

6.1 HEAD POSITION

The device was placed in a normal operating position with the Point A on the device, as illustrated in following drawing, aligned with the location of the RE(ERP) on the phantom. With the ear-piece pressed against the head, the vertical center line of the body of the handset was aligned with an imaginary plane consisting of the RE, LE and M. While maintaining these alignments, the body of the handset was gradually moved towards the cheek until any point on the mouth-piece or keypad contacted the cheek. This is a cheek/touch position. For ear/tilt position, while maintain the device aligned with the BM and FN lines, the device was pivot against ERP back for 15º or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

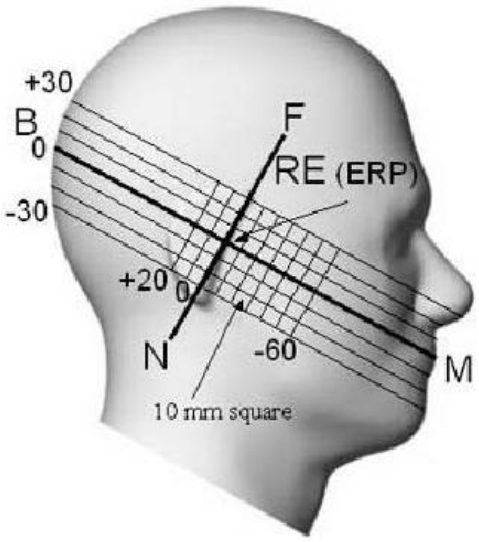


Figure 13. Side view of the phantom

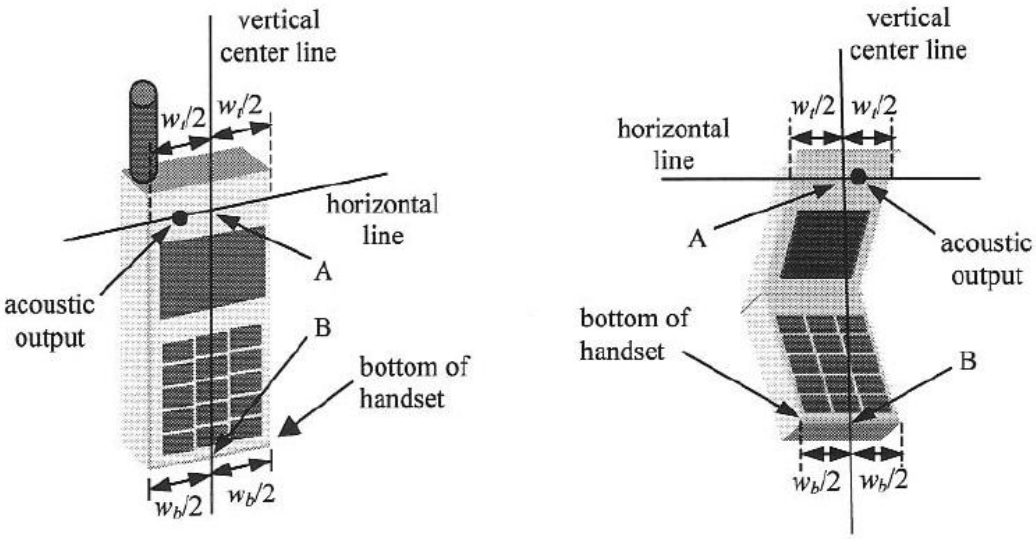


Figure 14. Handset vertical and horizontal reference lines

6.2 Body Holster/Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with each accessory. If multiple accessory share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some Devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used.

Since this EUT does not supply any body worn accessory to the end user a distance of 0.8 cm and 1.0 cm from the EUT back surface to the liquid interface is configured for the generic test.

"See the Test SET-UP Photo"

Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), Including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worstcase positioning is then documented and used to perform Body SAR testing.

6.3 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v05 should be applied to determine SAR test requirements.

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC minitablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 6484474 D04 v01r01DR04 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≥ 25 mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2W/kg.

7. MEASUREMENT UNCERTAINTY

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.00	N	1	1	6.00	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2.Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3.Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.32	9
Liquid Permitivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permitivity(meas.)	5.02	N	1	0.6	3.01	9
Combind Standard Uncertainty					11.13	
Coverage Factor for 95 %					$k=2$	
Expanded STD Uncertainty					22.25	

Table 7.1 Uncertainty (800 MHz- 2450 MHz)

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.55	N	1	1	6.00	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2.Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3.Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.32	9
Liquid Permitivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permitivity(meas.)	5.02	N	1	0.6	3.01	9
Combind Standard Uncertainty					11.43	
Coverage Factor for 95 %					*k*=2	
Expanded STD Uncertainty					22.86	

Table 7.2 Uncertainty (5000-5900 MHz)

8. ANSI/ IEEE C95.1 - 1992 RF EXPOSURE LIMITS

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 8.1 Safety Limits for Partial Body Exposure

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

*** The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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

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

9. SAR SYSTEM VALIDATION

Per FCC KCB 865664 D02v01, SAR system validation status should be document to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in IEEE 1528-2003 and FCC KDB 865664 D01 v01. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

SAR System #	Probe	probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isortopy	MOD. Type	Duty Factor	PAR
7	1630	ET3DV6	Head	835	441	May.06,2013	42.01	0.92	PASS	PASS	PASS	GMSK	PASS	N/A
7	1630	ET3DV6	Head	1800	2d007	Apr.1,2013	41.2	1.41	PASS	PASS	PASS	GMSK	PASS	N/A
7	1630	ET3DV6	Head	1900	5d032	Aug.07,2013	39.8	1.4	PASS	PASS	PASS	GMSK	PASS	N/A
7	1630	ET3DV6	Body	835	441	May.06,2013	55.88	0.99	PASS	PASS	PASS	GMSK	PASS	N/A
7	1630	ET3DV6	Body	1800	2d007	Apr.1,2013	52.2	1.5	PASS	PASS	PASS	GMSK	PASS	N/A
7	1630	ET3DV6	Body	1900	5d032	Aug.08,2013	51.8	1.54	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Head	2450	743	Sep.2,2013	38.91	1.81	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	2450	743	Sep.03,2013	52.32	1.96	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	5200	1107	Aug.09,2013	36.7	4.69	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	5300	1107	Aug.09,2013	36.48	4.78	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	5500	1107	Aug.09,2013	35.9	5.12	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	5600	1107	Aug.09,2013	35.55	5.11	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	5800	1107	Aug.09,2013	35.2	5.28	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5200	1107	Aug.09,2013	49.53	5.37	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5300	1107	Aug.09,2013	49.49	5.48	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5500	1107	Aug.09,2013	49.25	5.61	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5600	1107	Aug.09,2013	48.79	5.88	PASS	PASS	PASS	OFDM	N/A	PASS
1	3903	EX3DV4	Body	5800	1107	Aug.09,2013	48.31	6.18	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary 1g

SAR System #	Probe	probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isortopy	MOD. Type	Duty Factor	PAR
1	3863	EX3DV4	Body	5200	1107	Oct.07,2013	49.75	5.19	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5300	1107	Oct.07,2013	49.63	5.37	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5500	1107	Oct.07,2013	49.37	5.64	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5600	1107	Oct.07,2013	48.91	5.84	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	5800	1107	Oct.07,2013	48.48	6.15	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary – Extremity SAR Considerations

Note;
All measurement were performed using probes calibrated for CW signal only. Modulations in the table bove represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r01. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664.

10. SYSTEM VERIFICATION

10.1 Tissue Verification

Freq. [MHz]	Date	Probe	Dipole	Liquid	Liquid Temp. [°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
835	Nov. 12, 2013	1630	441	Head	20.4	ε r	41.5	40.4	- 2.65	± 5
						σ	0.90	0.918	+ 2.00	± 5
835	Nov. 13, 2013	1630		Body	20.1	ε r	55.2	54.4	- 1.45	± 5
						σ	0.97	0.984	+ 1.44	± 5
1 900	Nov. 14, 2013	1630	5d032	Head	20.6	ε r	40.0	40.8	+ 2.00	± 5
						σ	1.40	1.37	- 2.14	± 5
1 900	Nov. 15, 2013	1630		Body	20.4	ε r	53.3	53.4	+ 0.19	± 5
						σ	1.52	1.48	- 2.63	± 5
2 450	Nov. 18, 2013	3863	743	Head	20.2	ε r	39.2	38.7	- 1.28	± 5
						σ	1.80	1.83	+ 1.67	± 5
2 450	Nov. 18, 2013	3863		Body	20.2	ε r	52.7	53.1	+ 0.76	± 5
						σ	1.95	1.99	+ 2.05	± 5
5 200	Nov. 19, 2013	3863	1107	Head	20.1	ε_r	36	36.1	+ 0.28	± 5
						σ	4.66	4.5	- 3.43	± 5
5 300	Nov. 19, 2013	3863		Head	20.1	ε_r	35.9	35.7	- 0.56	± 5
						σ	4.76	4.65	- 2.31	± 5
5 500	Nov. 19, 2013	3863		Head	20.1	ε_r	35.6	35.3	- 0.84	± 5
						σ	4.96	4.82	- 2.82	± 5
5 600	Nov. 19, 2013	3863		Head	20.1	ε_r	35.5	35.2	- 0.85	± 5
						σ	5.07	4.92	- 2.96	± 5
5 800	Nov. 19, 2013	3863		Head	20.1	ε_r	35.3	34.5	- 2.27	± 5
						σ	5.27	5.19	- 1.52	± 5
5 200	Nov. 20, 2013	3863		Body	20.5	ε_r	49.01	47.6	- 2.88	± 5
						σ	5.3	5.17	- 2.45	± 5
5 300	Nov. 20, 2013	3863		Body	20.5	ε_r	48.85	47.4	- 2.97	± 5
						σ	5.42	5.34	- 1.48	± 5
5 500	Nov. 20, 2013	3863		Body	20.5	ε_r	48.6	46.9	- 3.50	± 5
						σ	5.65	5.68	+ 0.53	± 5
5 600	Nov. 20, 2013	3863		Body	20.5	ε_r	48.44	46.7	- 3.59	± 5
						σ	5.77	5.79	+ 0.35	± 5
5 800	Nov. 20, 2013	3863		Body	20.5	ε_r	48.2	46.3	- 3.94	± 5
						σ	6.00	5.98	- 0.33	± 5

The Tissue dielectronic parameters were measured prior to the SAR evaluation using an Agilent 85070C Dielectronic Probe Kit and Agilent Network Analyzer.

10.2 System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications at 835 MHz /1 900 MHz/ 2 450 MHz / 5 200 MHz/ 5 300 MHz/ 5 500 MHz/ 5 600 MHz/ 5 800 MHz by using the system Verification kit. (Graphic Plots Attached)

System Verification Results

Freq. [MHz]	Date	Probe (SN)	Dipole (SN)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) (mW/g)	Measured SAR_{1g} (mW/g)	1 W Normalized SAR_{1g} (mW/g)	Deviation [%]	Limit [%]
835	Nov. 12, 2013	1630	441	Head	20.6	20.4	9.68	0.966	9.66	- 0.21	± 10
835	Nov. 13, 2013			Body	20.3	20.1	9.69	0.981	9.81	+ 1.24	± 10
1 900	Nov. 14, 2013		5d032	Head	20.8	20.6	40.1	4.06	40.6	+ 1.25	± 10
1 900	Nov. 15, 2013			Body	20.6	20.4	40.5	4.21	42.1	+ 3.95	± 10
2 450	Nov. 18, 2013	3863	743	Head	20.4	20.2	52.8	5.16	51.6	- 2.27	± 10
2 450	Nov. 18, 2013			Body	20.4	20.2	50.5	5.1	51	+ 0.99	± 10
5 200	Nov. 19, 2013		1107	Head	20.3	20.1	80.1	8.28	82.8	+ 3.37	± 10
5 300	Nov. 19, 2013			Head	20.3	20.1	81.0	7.7	77	- 4.94	± 10
5 500	Nov. 19, 2013			Head	20.3	20.1	80.0	8.02	80.2	+ 0.25	± 10
5 600	Nov. 19, 2013			Head	20.3	20.1	84.4	8.16	81.6	- 3.32	± 10
5 800	Nov. 19, 2013			Head	20.3	20.1	78.3	7.77	77.7	- 0.77	± 10
5 200	Nov. 20, 2013			Body	20.7	20.5	74.3	7.73	77.3	+ 4.04	± 10
5 300	Nov. 20, 2013			Body	20.7	20.5	76.0	7.3	73	- 3.95	± 10
5 500	Nov. 20, 2013			Body	20.7	20.5	78.4	8.12	81.2	+ 3.57	± 10
5 600	Nov. 20, 2013			Body	20.7	20.5	81.0	8.17	81.7	+ 0.86	± 10
5 800	Nov. 20, 2013			Body	20.7	20.5	74.3	7.66	76.6	+ 3.10	± 10

System Verification Results – Extremity SAR

Freq. [MHz]	Date	Probe (SN)	Dipole (SN)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{10g} (SPEAG) (mW/g)	Measured SAR_{10g} (mW/g)	1 W Normalized SAR_{10g} (mW/g)	Deviation [%]	Limit [%]
5 200	Nov. 20, 2013	3863	1107	Body	20.7	20.5	20.8	2.19	21.9	+ 5.29	± 10
5 300	Nov. 20, 2013			Body	20.7	20.5	21.3	2.08	20.8	- 2.35	± 10
5 500	Nov. 20, 2013			Body	20.7	20.5	21.7	2.31	23.1	+ 6.45	± 10
5 600	Nov. 20, 2013			Body	20.7	20.5	22.3	2.31	23.1	+ 3.59	± 10
5 800	Nov. 20, 2013			Body	20.7	20.5	20.4	2.16	21.6	+ 5.88	± 10

10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system Verification kit. (Graphic Plots Attached)

- Cabling the system, using the Verification kit equipments.
- Generate about 100 mW Input Level from the Signal generator to the Dipole Antenna.
- Dipole Antenna was placed below the Flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

11. RF CONDUCTED POWER MEASUREMENT

Power measurements were performed using a base station simulator under digital average power.
The handset was placed into a simulated call using a base station simulator in a shielded chamber.
Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR
SAR measurements were taken with a fully charged battery. In order to verify that the device was tested
and maintained at full power, this was configured with the base station simulator. 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 then 5 % occurred, the tests were repeated.

11.1 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 D01v05.

GSM

GSM850	GSM1900
Target Power : 33.2 dBm	Target Power : 30.2 dBm
GPRS850	PCS1900
GPRS 1tx : 33.2 dBm/ EGPRS 1tx : 26.7 dBm	GPRS 1tx : 30.2 dBm/ EGPRS 1tx : 25.7 dBm
GPRS 2tx : 31.2 dBm/ EGPRS 2tx : 25.2 dBm	GPRS 2tx : 28.7 dBm/ EGPRS 2tx : 24.2 dBm
GPRS 3tx : 29.7 dBm/ EGPRS 3tx : 23.2 dBm	GPRS 3tx : 26.7 dBm/ EGPRS 3tx : 22.7 dBm
GPRS 4tx : 28.2 dBm/ EGPRS 4tx : 21.7 dBm	GPRS 4tx : 25.2 dBm/ EGPRS 4tx : 21.2 dBm
Tune-up Tolerance : -1.5 dB/ +0.5 dB	

Wifi

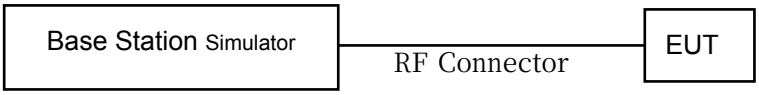
Wifi (Average Power)	Mode / Band									
	2.4 GHz				5 GHz					
	802.11 b	802.11 g	802.11 n	802.11ac	802.11 a	802.11 n (20MHz)	802.11 n (40MHz)	802.11ac (20MHz)	802.11ac (40MHz)	802.11ac (80MHz)
Maximum	16.5dBm	12.5dBm	12.5dBm	12dBm	13dBm	12dBm	11.5dBm	11.5dBm	10.5dBm	9.5dBm
Nominal	15.5dBm	11.5dBm	11.5dBm	11dBm	12dBm	11dBm	10.5dBm	10.5dBm	9.5dBm	8.5dBm

BT.

Bluetooth (Average Power)	Mode / Band			
	1 Mbps (GFSK)	2 Mbps (DPSK)	3 Mbos(8DPSK)	LE
Maximum	9 dBm	8 dBm	8 dBm	4 dBm
Nominal	7.5 dBm	6.5 dBm	6.5 dBm	2.5 dBm

11.2 GSM

Conducted output power measurements were performed using a base station simulator under digital average power.



SAR Test for WWAN were performed with a base station simulator Agilent E5515C. Communication between the device and the emulator was established by air link. Set base station emulator to allow DUT to radiate maximum output power during all tests. Please refer to the below worst case SAR operation setup.

- GSM voice: Head SAR
- GPRS Multi-slots : Body SAR with GPRS Multi-slot Class12 with CS 1 (GMSK)

Note;
CS1/MCS7 coding scheme was used in GPRS/EDGE output power measurements and SAR Testing, as a condition where GMSK/8PSK modulation was ensured. Investigation has shown that CS1 - CS4/ MCS5 – MCS9 settings do not have any impact on the output levels in the GPRS/EDGE modes.

GSM Conducted output powers (Burst-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1				EDGE Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	33.70	33.70	31.46	30.17	28.61	27.10	25.55	23.31	21.88
	190	33.32	33.28	31.26	30.14	28.55	27.01	25.37	23.22	21.79
	251	33.34	33.32	31.24	30.06	28.56	27.00	25.33	23.18	21.73
GSM 1900	512	30.33	30.33	28.93	27.09	25.25	25.80	24.43	22.81	21.07
	661	30.20	30.19	28.80	26.84	24.91	25.67	24.30	22.68	20.85
	810	30.22	30.19	28.81	27.01	25.10	25.76	24.40	22.76	20.89

GSM Conducted output powers (Frame-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1				EDGE Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	24.67	24.67	25.44	25.91	25.60	18.07	19.53	19.05	18.87
	190	24.29	24.25	25.24	25.88	25.54	17.98	19.35	18.96	18.78
	251	24.31	24.29	25.22	25.80	25.55	17.97	19.31	18.92	18.72
GSM 1900	512	21.30	21.30	22.91	22.83	22.24	16.77	18.41	18.55	18.06
	661	21.17	21.16	22.78	22.58	21.90	16.64	18.28	18.42	17.84
	810	21.19	21.16	22.79	22.75	22.09	16.73	18.38	18.50	17.88

Note:
Time slot average factor is as follows:
1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB
2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB
3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB
4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

11.3 WiFi

11.3.1 SAR Testing for 802.11b/g/n modes

General Device Setup

Normal Network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

Frequency Channel Configurations

802.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g modes are tested on channels 1, 6 and 11.802.11a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; Channels 104, 116, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz § 15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 4.9 GHz is tested on channels 1, 10 and 5 or 6, whichever has the higher output power, for 5 MHz channels; channels 11,15 and 19 for 10 MHz channels; and channels 21 and 25 for 20 MHz channels.

These are referred to as the “default test channels”. 802.11g mode was evaluated only if the output power was 0.25 dB higher than the 802.11b mode.

Mode		GHz	Channel	Turbo Channel	“Default Test Channels”			
					§15.247		UNII	
					802.11b	802.11g		
802.11b/g		2.412	1#		√	∇		
		2.437	6	6	√	∇		
		2.462	11#		√	∇		
802.11a	UNII	5.18	36				√	
		5.20	40	42 (5.21 GHz)				*
		5.22	44					*
		5.24	48	50 (5.25 GHz)			√	
		5.26	52				√	
		5.28	56	58 (5.29 GHz)				*
		5.30	60					*
		5.32	64				√	
		5.500	100	Unknown				*
		5.520	104				√	
		5.540	108					*
		5.560	112					*
		5.580	116				√	
		5.600	120					*
		5.620	124				√	
		5.640	128					*
		5.660	132					*
		5.680	136				√	
		5.700	140					*
	UNII or §15.247	5.745	149		√		√	
		5.765	153	152 (5.76 GHz)		*		*
		5.785	157		√			*
		5.805	161	160 (5.80 GHz)		*	√	
	§15.247	5.825	165		√			

802.11 Test Channels per FCC Requirements

IEEE 802.11b Average RF Power

Mode	Freq. [MHz]	Channel	802.11b (2.4 GHz) Conducted Power [dBm]			
			Data Rate (Mbps)			
			1	2	5.5	11
802.11b	2412	1	15.38	15.36	15.30	15.41
	2437	6	16.00	15.97	15.98	15.96
	2462	11	15.66	15.61	15.55	15.67

IEEE 802.11g Average RF Power

Mode	Freq. [MHz]	Channel	802.11g (2.4 GHz) Conducted Power [dBm]							
			Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11g	2412	1	11.81	11.70	11.83	11.78	11.85	11.87	12.03	11.81
	2437	6	12.30	12.23	12.26	12.45	12.37	12.31	12.50	12.42
	2462	1	11.87	11.94	12.04	11.93	11.89	11.93	12.14	12.05

IEEE 802.11n Average RF Power

Mode	Freq. [MHz]	Channel	802.11n (2.4 GHz) Conducted Power [dBm]							
			Data Rate (Mbps)							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	2412	1	11.68	11.73	11.73	11.70	11.87	11.94	11.90	11.92
	2437	6	12.14	12.25	12.35	12.29	12.43	12.47	12.50	12.48
	2462	1	11.82	11.95	11.88	11.98	12.01	12.14	12.18	12.17

IEEE 802.11ac Average RF Power

Mode	Freq. [MHz]	Channel	802.11ac (2.4 GHz) Conducted Power [dBm]								
			Data Rate (Mbps)								
			6.5	13	19.5	26	39	52	58.5	65	78
802.11ac	2412	1	10.57	10.82	10.87	10.84	10.85	10.89	10.93	10.96	11.08
	2437	6	11.27	11.39	11.22	11.37	11.35	11.43	11.50	11.48	11.47
	2462	1	10.81	10.79	10.96	11.01	11.07	11.09	11.23	11.28	11.31

IEEE 802.11a Average RF Power– 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	802.11a (5 GHz) Conducted Power [dBm]							
			Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11a	5180	36	12.48	12.20	12.36	12.29	12.19	12.19	12.38	12.30
	5200	40	12.51	12.23	12.39	12.38	12.26	12.19	12.33	12.15
	5220	44	12.42	12.29	12.30	12.26	12.16	12.08	12.13	12.06
	5240	48	12.39	12.25	12.31	12.12	12.22	12.06	12.16	12.04
	5260	52	12.70	12.43	12.51	12.44	12.43	12.43	12.55	12.40
	5280	56	12.58	12.34	12.44	12.34	12.37	12.25	12.34	12.21
	5300	60	12.49	12.33	12.46	12.30	12.33	12.26	12.38	12.27
	5320	64	12.44	12.47	12.29	12.43	12.28	12.29	12.41	12.30
	5500	100	12.22	12.28	12.12	12.11	12.07	12.07	12.35	12.34
	5520	104	12.13	12.18	12.02	12.07	12.06	12.04	12.24	12.33
	5540	108	11.94	11.98	11.87	11.85	11.78	11.77	11.85	11.72
	5560	112	11.84	11.84	11.82	11.89	11.77	11.77	11.83	11.71
	5580	116	11.73	11.79	11.79	11.82	11.74	11.76	11.84	11.69
	5660	132	11.51	11.52	11.58	11.57	11.56	11.52	11.58	11.48
	5680	136	11.48	11.42	11.49	11.55	11.46	11.42	11.54	11.44
	5700	140	11.36	11.32	11.38	11.44	11.42	11.31	11.52	11.46
	5720	144	11.23	11.31	11.35	11.51	11.27	11.41	11.57	11.34
	5745	149	11.54	11.61	11.62	11.62	11.54	11.58	11.63	11.59
	5765	153	11.48	11.57	11.55	11.55	11.42	11.52	11.52	11.44
	5785	157	11.37	11.40	11.47	11.44	11.42	11.43	11.50	11.36
	5805	161	11.25	11.28	11.38	11.32	11.32	11.31	11.38	11.28
	5825	165	11.17	11.19	11.22	11.25	11.22	11.20	11.29	11.18

IEEE 802.11n Average RF Power – 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	20 MHz BW 802.11n (5 GHz) Conducted Power [dBm]							
			Data Rate (Mbps)							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	9.93	11.44	11.30	11.35	11.44	11.43	11.35	11.39
	5200	40	11.66	11.37	11.24	11.38	11.33	11.53	11.31	11.33
	5220	44	11.32	11.08	11.29	11.27	11.28	11.39	11.29	11.23
	5240	48	11.45	11.39	11.30	11.29	11.16	11.14	11.15	11.20
	5260	52	11.78	11.65	11.62	11.56	11.37	11.59	11.73	11.48
	5280	56	11.63	11.54	11.52	11.54	11.46	11.57	11.64	11.47
	5300	60	11.58	11.59	11.45	11.45	11.56	11.57	11.37	11.52
	5320	64	11.53	11.42	11.48	11.46	11.48	11.36	11.49	11.33
	5500	100	11.27	11.34	11.29	11.29	11.36	11.30	11.41	11.41
	5520	104	11.25	11.27	11.26	11.26	11.28	11.22	11.37	11.28
	5540	108	11.22	11.28	11.27	11.27	11.21	11.23	11.28	11.21
	5560	112	11.14	11.12	11.12	11.12	11.11	11.11	11.14	11.22
	5580	116	11.02	11.03	10.98	11.12	11.01	11.09	11.07	11.10
	5660	132	10.77	10.63	10.51	10.44	10.67	10.52	10.77	10.86
	5680	136	10.55	10.32	10.48	10.33	10.55	10.55	10.69	10.43
	5700	140	10.42	10.31	10.38	10.33	10.39	10.48	10.55	10.63
	5720	144	10.53	10.64	10.66	10.58	10.72	10.55	10.67	10.64
	5745	149	10.58	10.74	10.74	10.78	10.72	10.68	10.72	10.69
	5765	153	10.41	10.51	10.52	10.69	10.71	10.57	10.62	10.52
	5785	157	10.53	10.62	10.45	10.51	10.53	10.46	10.53	10.49
	5805	161	10.31	10.48	10.38	10.46	10.34	10.38	10.42	10.48
	5825	165	10.29	10.27	10.34	10.36	10.27	10.33	10.41	10.40

IEEE 802.11ac Average RF Power – 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	802.11ac (5 GHz) Conducted Power [dBm]								
			Data Rate (Mbps)								
			6.5	13	19.5	26	39	52	58.5	65	78
802.11ac	5180	36	10.37	10.50	10.31	10.33	10.38	10.35	10.42	10.46	10.38
	5200	40	10.29	10.35	10.27	10.32	10.34	10.20	10.22	10.29	10.31
	5220	44	10.11	10.27	10.25	10.22	10.23	10.21	10.19	10.21	10.23
	5240	48	10.16	10.16	10.24	10.19	10.27	10.11	10.16	10.19	10.12
	5260	52	10.64	10.71	10.56	10.53	10.77	10.53	10.66	10.45	10.56
	5280	56	10.53	10.61	10.48	10.52	10.50	10.57	10.56	10.54	10.55
	5300	60	10.55	10.60	10.42	10.59	10.42	10.48	10.42	10.48	10.40
	5320	64	10.60	10.48	10.52	10.33	10.48	10.26	10.48	10.35	10.38
	5500	100	10.54	10.36	10.39	10.37	10.28	10.44	10.42	10.33	10.35
	5520	104	10.44	10.32	10.39	10.38	10.34	10.33	10.32	10.27	10.35
	5540	108	10.21	10.27	10.21	10.28	10.23	10.21	10.28	10.27	10.22
	5560	112	10.18	10.16	10.17	10.12	10.06	10.17	10.12	10.14	10.12
	5580	116	10.05	10.12	10.08	10.02	9.96	10.23	10.22	10.14	10.07
	5660	132	9.78	9.57	9.33	9.31	9.32	9.36	9.37	9.32	8.32
	5680	136	9.65	9.45	9.52	9.55	9.55	9.56	9.55	9.59	9.54
	5700	140	9.49	9.43	9.55	9.41	9.49	9.48	9.45	9.52	9.49
	5720	144	9.71	9.54	9.72	9.56	9.70	9.66	9.60	9.58	9.55
	5745	149	9.67	9.71	9.74	9.74	9.70	9.67	9.67	9.70	9.69
	5765	153	9.54	9.52	9.53	9.55	9.55	9.53	9.57	9.52	9.42
	5785	157	9.48	9.59	9.62	9.55	9.52	9.50	9.57	9.52	9.56
	5805	161	9.28	9.25	9.29	9.25	9.21	9.21	9.25	9.28	9.17
	5825	165	9.33	9.42	9.35	9.33	9.41	9.36	9.46	9.35	9.37

IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq. [MHz]	Channel	40 MHz BW 802.11n (5 GHz) Conducted Power [dBm]							
			Data Rate (Mbps)							
			13.5	27	40.5	54	81	108	121.5	135
802.11n	5190	38	11.09	10.76	11.08	11.03	10.56	10.66	10.62	10.95
	5230	46	11.03	10.96	10.67	11.02	10.56	10.86	10.63	10.77
	5270	54	11.20	11.48	11.45	11.00	11.07	11.34	11.39	10.96
	5310	62	11.21	10.77	10.83	10.87	11.34	10.67	10.82	11.13
	5510	102	10.54	10.45	10.51	10.57	10.61	10.41	10.65	10.43
	5550	110	10.78	10.54	10.68	10.68	10.63	10.59	10.67	10.60
	5670	134	10.22	10.21	10.35	10.23	10.29	10.26	10.24	10.23
	5710	142	10.04	10.06	10.19	9.94	10.00	9.74	9.76	9.95
	5755	151	9.70	9.66	9.67	9.61	9.46	9.64	9.36	9.48
	5795	159	10.01	9.96	9.98	10.01	9.78	9.13	9.87	9.23

IEEE 802.11ac Average RF Power – 40 MHz Bandwidth

Mode	Freq. [MHz]	Channel	40 MHz BW 802.11ac (5 GHz) Conducted Power [dBm]									
			Data Rate (Mbps)									
			13.5	27	40.5	54	81	108	121.5	135	162	180
802.11ac	5190	38	9.83	9.88	10.20	10.29	10.14	9.74	9.78	10.11	10.22	10.13
	5230	46	9.76	10.12	10.10	9.74	9.79	9.76	10.10	9.72	9.77	10.16
	5270	54	10.27	10.25	10.49	10.51	10.52	10.55	10.53	10.61	10.35	10.08
	5310	62	9.81	9.84	10.25	9.89	9.73	9.84	10.20	10.20	9.74	10.28
	5510	102	9.42	9.40	9.27	9.19	9.39	9.22	9.32	9.27	9.18	9.39
	5550	110	9.48	9.47	9.39	9.39	9.38	9.31	9.42	9.53	9.34	9.26
	5670	134	9.38	9.35	9.28	9.26	9.24	9.22	9.31	9.28	9.24	9.22
	5710	142	9.04	8.83	8.74	8.75	8.66	8.70	8.70	8.65	8.63	8.68
	5755	151	8.54	8.75	8.57	8.58	8.52	8.62	8.77	8.53	8.64	8.67
	5795	159	8.35	8.80	8.75	8.86	8.84	8.75	8.37	8.81	8.19	8.32

IEEE 802.11ac Average RF Power – 80 MHz Bandwidth

Mode	Freq. [MHz]	Channel	80 MHz BW 802.11ac (5 GHz) Conducted Power [dBm]									
			Data Rate (Mbps)									
			29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
802.11ac	5210	42	9.42	9.40	9.44	9.31	9.45	9.39	9.39	9.34	9.44	9.37
	5290	58	9.49	9.39	9.41	9.44	9.38	9.38	9.50	9.37	9.49	9.39
	5530	106	8.77	8.73	8.71	8.78	8.75	8.64	8.70	8.72	8.75	8.68
	5690	138	8.11	8.11	8.09	7.99	8.01	8.00	7.98	7.98	8.02	7.90
	5775	155	8.33	8.28	8.26	8.19	8.23	8.29	8.21	8.22	8.17	8.22

11.4 Test Exclusions Applied

11.4.1 BT

Per FCC KDB Publication 648474 D03-D04, this device is considered a “phablet” since its diagonal distance, 170.1 mm, is greater than 160 mm. Therefore hand SAR tests are required. Because wireless router operations are not supported for 5 GHz NII WIFI, hand SAR was evaluated for 5 GHz NII WIFI. However, hand SAR was not evaluated for 2.4 GHz WIFI and 5 GHz DTS WIFI since Hotspot SAR for 2.4 GHz WIFI and 5 GHz DTS WIFI were < 1.2 W/kg.”

Per FCC KDB 447498 D01v05, The SAR exclusion threshold for distance < 50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel(mW)}{Test\ \ Separation\ Distance\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

. Mode	Frequency	Maximum Allowed Power	Separatuin Distance	≤ 3.0
	[MHz]	[mW]	[mm]	
Bluetooth	2441	8	10	1.25
Bluetooth LE	2441	3	10	0.47

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Bluetooth SAR was not required [(8/10)*√2.441] = 1.25 < 3.0.
Bluetooth LE SAR was not required [(3/10)*√2.441] = 0.47 < 3.0.

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6W/kg. When standalone SAR is not required to be measured per FCC KDB 447498 D01v05 4.3.22, the following equation must be used to estimate the standalone 1-g SAR for simultaneous transmission assessment involving that transmitter

$$Estimated\ SAR = \frac{\sqrt{f(GHZ)}}{7.5} * \frac{(Max\ Power\ of\ channel\ mW)}{Min\ Seperation\ Distance}.$$

. Mode	Frequency	Maximum Allowed Power	Separatuin Distance (Body)	Estimated SAR (Body)
	[MHz]	[mW]	[mm]	[W/kg]
Bluetooth	2441	8	10	0.17
Bluetooth LE	2441	3	10	0.06

Note : Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. The Estimated SAR results were determined according to FCC KDB447498 D01v05

11.4.2 Licenced Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GMS Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

Justification for reduced test configurations per KDB 941225 D03v01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power was evaluated for SAR.

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that descrived for device with HSUPA in KDB 941225 D01v02.

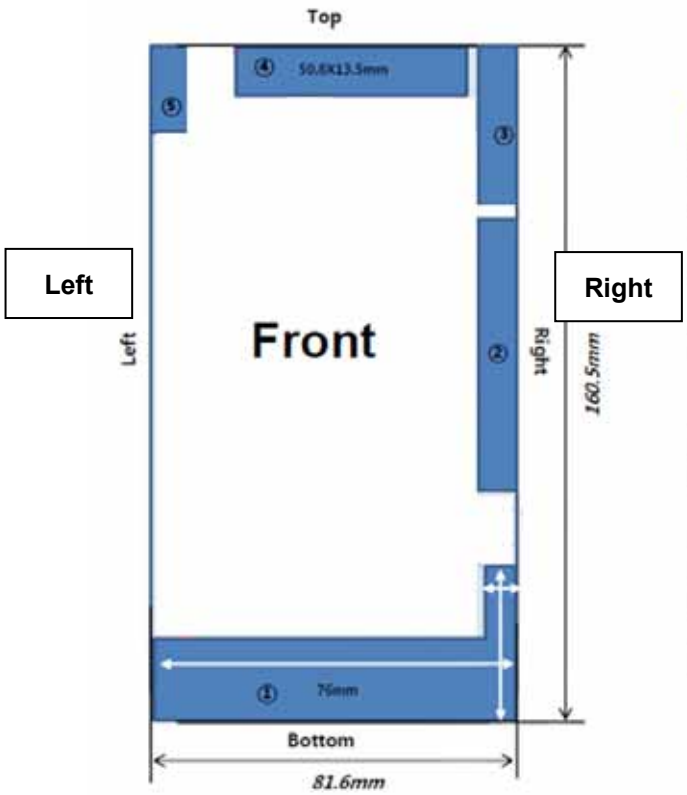
Per FCC KDB Publication 648474 D04 Handset SAR v01r01, since the device is a paablet and all hotspot SAR was < 1.2 W/kg, hand SAR was not required for licensed transmitters.

12. SAR Test configuration & Antenna Information

12.1 Mobile Hotspot sides for SAR Testing configurations

Mode	Rear	Front	Left	Right	Bottom	Top
GSM 850	Yes	Yes	Yes	Yes	Yes	No
GSM 1 900	Yes	Yes	Yes	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes

12.2 Antenna and Device Information



Antenna	Mode	Band
①	GSM	G850 Tx,Rx
	GSM	EGSM Tx,Rx
	GSM	GSM1800 Tx,Rx
	GSM	GSM1900 Tx,Rx
	WCDMA	Band 1 Tx,Rx
	WCDMA	Band 8 Tx,Rx
	LTE	Band 3 Tx,Rx
	LTE	Band 20 Tx,Rx
	LTE	Band 7 Tx,Rx
②	LTE	Band 20 2nd Rx
③	GNSS	1.574~1.6GHz
	LTE	Band 7 2nd Rx
④	LTE	Band 3 2nd Rx
	WCDMA	Band 1 2nd Rx
	WCDMA	Band 8 2nd Rx
⑤	Bluetooth	2.4GHz
	Wi-Fi	2.4GHz / 5GHz

Note;

1. Per FCC KDB Publication 941225 D06v01, we performed the SAR testing at 0.8 cm and 1.0 cm from the top & bottom surfaces and also from side edges with a transmitting antenna ≤ 2.5 cm from an edge.
*Please see the D955_Antenna distance for futher information.
2. This EUT doesn't support LTE communication but the EUT have LTE device.

13. SAR TEST DATA SUMMARY

13.1-1 Measurement Results (GSM850 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Battery	Phantom Position	Measured SAR(mW/g)	Scaling Facor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GSM850	33.7	33.32	-0.057	Standard	Left Ear	0.169	1.091	0.184	-
836.6	190		33.7	33.32	0.119	Standard	Left Tilt	0.097	1.091	0.106	-
836.6	190		33.7	33.32	-0.151	Standard	Right Ear	0.139	1.091	0.152	-
836.6	190		33.7	33.32	0.172	Standard	Right Tilt	0.109	1.091	0.119	-
836.6	190	GPRS 3Tx	30.2	30.14	-0.163	Standard	Left Ear	0.202	1.014	0.205	1
836.6	190		30.2	30.14	-0.149	Standard	Left Tilt	0.113	1.014	0.115	-
836.6	190		30.2	30.14	-0.143	Standard	Right Ear	0.171	1.014	0.173	-
836.6	190		30.2	30.14	-0.173	Standard	Right Tilt	0.129	1.014	0.131	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Head 1.6 W/kg (mW/g) **Averaged over 1 gram				

13.1-2 Measurement Results (GSM1900 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Battery	Phantom Position	Measured SAR(mW/g)	Scaling Facor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880.0	661	GSM 1900	30.7	30.20	-0.106	Standard	Left Ear	0.146	1.122	0.164	-
1 880.0	661		30.7	30.20	0.122	Standard	Left Tilt	0.061	1.122	0.068	-
1 880.0	661		30.7	30.20	-0.048	Standard	Right Ear	0.192	1.122	0.215	-
1 880.0	661		30.7	30.20	-0.157	Standard	Right Tilt	0.096	1.122	0.108	-
1 880.0	661	GPRS 2Tx	29.2	28.80	-0.090	Standard	Left Ear	0.206	1.096	0.226	-
1 880.0	661		29.2	28.80	-0.043	Standard	Left Tilt	0.084	1.096	0.092	-
1 880.0	661		29.2	28.80	-0.167	Standard	Right Ear	0.269	1.096	0.295	2
1 880.0	661		29.2	28.80	-0.037	Standard	Right Tilt	0.126	1.096	0.138	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Head 1.6 W/kg (mW/g) **Averaged over 1 gram				

13.1-3 Measurement Results (DTS Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Battery	Phantom Position	Data Rate	Measured SAR(mW/g)	Scaling Facor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power								
2 437	6	802.11b	16.5	16.00	-0.144	Standard	Left Ear	1Mbps	0.097	1.122	0.109	-
			16.5	16.00	0.167	Standard	Left Tilt	1Mbps	0.073	1.122	0.082	-
			16.5	16.00	0.093	Standard	Right Ear	1Mbps	0.269	1.122	0.302	3
			16.5	16.00	0.157	Standard	Right Tilt	1Mbps	0.149	1.122	0.167	-
5 745	149	802.11a	13.0	11.54	0.189	Standard	Left Ear	6Mbps	0.061	1.400	0.085	-
			13.0	11.54	0.157	Standard	Left Tilt	6Mbps	0.042	1.400	0.059	-
			13.0	11.54	-0.106	Standard	Right Ear	6Mbps	0.213	1.400	0.298	4
			13.0	11.54	0.142	Standard	Right Tilt	6Mbps	0.166	1.400	0.232	-
5 775	155	802.11ac	9.5	8.33	0.115	Standard	Right Ear	29.3Mbps	0.106	1.309	0.139	-
ANSI/ IEEE C95.1 - 1992– Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**							**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram					

13.1-4 Measurement Results (NII Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Battery	Phantom Position	Data Rate	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch		Tune-Up Limit	Conducted Power								
5 180	36	802.11a	13.0	12.48	0.135	Standard	Left Ear	6Mbps	0.035	1.127	0.039	-
5 180	36	802.11a	13.0	12.48	0.121	Standard	Left Tilt	6Mbps	0.024	1.127	0.027	-
5 180	36	802.11a	13.0	12.48	0.134	Standard	Right Ear	6Mbps	0.139	1.127	0.157	-
5 180	36	802.11a	13.0	12.48	0.133	Standard	Right Tilt	6Mbps	0.071	1.127	0.080	-
5 210	42	802.11ac	9.5	9.42	0.166	Standard	Right Ear	29.3Mbps	0.067	1.019	0.068	-
5260	52	802.11a	13.0	12.70	0.013	Standard	Left Ear	6Mbps	0.040	1.072	0.043	-
5260	52	802.11a	13.0	12.70	0.029	Standard	Left Tilt	6Mbps	0.031	1.072	0.033	-
5260	52	802.11a	13.0	12.70	-0.110	Standard	Right Ear	6Mbps	0.162	1.072	0.174	
5260	52	802.11a	13.0	12.70	-0.063	Standard	Right Tilt	6Mbps	0.100	1.072	0.107	-
5 290	58	802.11ac	9.5	9.49	0.121	Standard	Right Ear	29.3Mbps	0.070	1.002	0.070	-
5 500	100	802.11a	13.0	12.07	-0.141	Standard	Left Ear	6Mbps	0.094	1.239	0.116	-
5 500	100	802.11a	13.0	12.07	0.130	Standard	Left Tilt	6Mbps	0.074	1.239	0.092	-
5 500	100	802.11a	13.0	12.07	0.141	Standard	Right Ear	6Mbps	0.232	1.239	0.287	5
5 500	100	802.11a	13.0	12.07	0.184	Standard	Right Tilt	6Mbps	0.173	1.239	0.214	-
5 530	106	802.11ac	9.5	8.77	0.142	Standard	Right Ear	29.3Mbps	0.132	1.183	0.156	-
5 690	138	802.11ac	9.5	8.11	0.189	Standard	Right Ear	29.3Mbps	0.124	1.377	0.171	
ANSI/ IEEE C95.1 - 1992– Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**							**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram					

13.2-1 Measurement Results (GSM850 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR(mW/g)	Scaling Facor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GPRS 3Tx	30.2	30.14	-0.127	Rear	0.8 cm	0.238	1.014	0.241	6
836.6	190		30.2	30.14	-0.026	Front	0.8 cm	0.380	1.014	0.385	7
836.6	190		30.2	30.14	-0.069	Left	1.0 cm	0.354	1.014	0.359	-
836.6	190		30.2	30.14	-0.110	Right	1.0 cm	0.354	1.014	0.359	-
836.6	190		30.2	30.14	-0.172	Bottom	1.0 cm	0.191	1.014	0.194	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Body 1.6 W/kg (mW/g) **Averaged over 1 gram				

13. 2-2 Measurement Results (GSM1900 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880.0	661	GPRS 2Tx	29.2	28.80	0.050	Rear	0.8 cm	0.626	1.096	0.686	8
1 880.0	661		29.2	28.80	-0.048	Front	0.8 cm	0.641	1.096	0.703	9
1 880.0	661		29.2	28.80	0.047	Left	1.0 cm	0.173	1.096	0.190	-
1 880.0	661		29.2	28.80	-0.071	Right	1.0 cm	0.190	1.096	0.208	-
1 880.0	661		29.2	28.80	-0.078	Bottom	1.0 cm	0.422	1.096	0.463	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Body 1.6 W/kg (mW/g) **Averaged over 1 gram				

13. 2-3 Measurement Results (WLAN Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch		Tune-Up Limit	Conducted Power								
2 437	6	802.11b	16.5	16.00	0.007	Rear	1Mbps	0.8 cm	0.143	1.122	0.160	10
			16.5	16.00	-0.119	Front	1Mbps	0.8 cm	0.065	1.122	0.073	-
			16.5	16.00	0.100	Left	1Mbps	1.0 cm	0.101	1.122	0.113	-
			16.5	16.00	0.168	Top	1Mbps	1.0 cm	0.014	1.122	0.016	-
5 745	149	802.11a	13.0	11.54	-0.197	Rear	6Mbps	0.8 cm	0.127	1.400	0.178	11
			13.0	11.54	0.117	Front	6Mbps	0.8 cm	0.068	1.400	0.095	-
			13.0	11.54	0.132	Left	6Mbps	1.0 cm	0.103	1.400	0.144	-
			13.0	11.54	0.158	Top	6Mbps	1.0 cm	0.053	1.400	0.074	-
5 775	155	802.11ac	9.5	8.33	-0.173	Rear	29.3Mbps	1.0 cm	0.070	1.309	0.092	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Body 1.6 W/kg (mW/g) **Averaged over 1 gram					

13.3-1 Measurement Results (WLAN Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power								
2 437	6	802.11b	16.5	16.00	0.007	Rear	1Mbps	0.8 cm	0.143	1.122	0.160	10
5 745	149	802.11a	13.0	11.54	-0.197	Rear	6Mbps	0.8 cm	0.127	1.400	0.178	11
5 775	155	802.11ac	9.5	8.33	-0.173	Rear	29.3Mbps	0.8 cm	0.070	1.309	0.092	-
ANSI/ IEEE C95.1 - 1992– Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**							**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram					

13.3-2 Measurement Results (NII Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch		Tune-Up Limit	Conducted Power								
5 180	36	802.11a	13.0	12.48	-0.126	Rear	6Mbps	0.8 cm	0.094	1.127	0.106	-
5 210	42	802.11ac	9.5	9.42	0.076	Rear	29.3Mbps	0.8 cm	0.045	1.019	0.046	-
5 260	52	802.11a	13.0	12.70	0.147	Rear	6Mbps	0.8 cm	0.141	1.072	0.151	-
5 290	58	802.11ac	9.5	9.49	-0.035	Rear	29.3Mbps	0.8 cm	0.081	1.002	0.081	-
5 500	100	802.11a	13.0	12.07	-0.136	Rear	6Mbps	0.8 cm	0.174	1.239	0.216	12
5 530	106	802.11ac	9.5	8.77	0.024	Rear	29.3Mbps	0.8 cm	0.105	1.183	0.124	-
5 690	138	802.11ac	9.5	8.11	-0.121	Rear	29.3Mbps	0.8 cm	0.091	1.377	0.125	-
ANSI/ IEEE C95.1 - 1992– Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**							**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram					

13.3-3 Measurement Results (Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GSM850	33.7	33.32	0.107	Rear	0.8 cm	0.196	1.091	0.214	-
836.6	190	GPRS 3Tx	30.2	30.14	-0.127	Rear	0.8 cm	0.238	1.014	0.241	6
1 880.0	661	GSM1900	30.7	30.20	-0.009	Rear	0.8 cm	0.406	1.122	0.456	-
1 880.0	661	GPRS 2Tx	29.2	28.80	0.050	Rear	0.8 cm	0.626	1.096	0.686	8
ANSI/ IEEE C95.1 - 1992– Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**							**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram				

13.4-1 Measurement Results (NII Hand SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Measured SAR (mW/g)	Scaling Facor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power								
5 180	36	802.11a	13.0	12.48	-0.168	Rear	6Mbps	0 cm	0.103	1.127	0.116	-
5 180	36	802.11a	13.0	12.48	-0.134	Front	6Mbps	0 cm	0.046	1.127	0.052	-
5 180	36	802.11a	13.0	12.48	0.162	Left	6Mbps	0 cm	0.229	1.127	0.258	-
5 180	36	802.11a	13.0	12.48	0.000	Top	6Mbps	0 cm	0.016	1.127	0.018	-
5 210	42	802.11ac	9.5	9.42	0.142	Left	29.3Mbps	0 cm	0.123	1.019	0.125	-
5 260	52	802.11a	13.0	12.70	-0.182	Rear	6Mbps	0 cm	0.173	1.072	0.185	-
5 260	52	802.11a	13.0	12.70	0.190	Front	6Mbps	0 cm	0.091	1.072	0.098	-
5 260	52	802.11a	13.0	12.70	0.180	Left	6Mbps	0 cm	0.266	1.072	0.285	-
5 260	52	802.11a	13.0	12.70	0.100	Top	6Mbps	0 cm	0.011	1.072	0.012	-
5 290	58	802.11ac	9.5	9.49	-0.115	Left	29.3Mbps	0 cm	0.119	1.002	0.119	-
5 500	100	802.11a	13.0	12.07	0.036	Rear	6Mbps	0 cm	0.214	1.239	0.265	-
5 500	100	802.11a	13.0	12.07	0.133	Front	6Mbps	0 cm	0.127	1.239	0.157	-
5 500	100	802.11a	13.0	12.07	0.129	Left	6Mbps	0 cm	0.281	1.239	0.348	13
5 500	100	802.11a	13.0	12.07	0.128	Top	6Mbps	0 cm	0.018	1.239	0.022	-
5 530	106	802.11ac	9.5	8.77	-0.188	Left	29.3Mbps	0 cm	0.149	1.183	0.176	-
5 690	138	802.11ac	9.5	8.11	0.129	Left	29.3Mbps	0 cm	0.143	1.377	0.197	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Body 2.0 W/kg (mW/g) Averaged over 10 gram**					

13.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v05.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB 648474 D04v01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluation using a headset cable were required.
8. Per FCC KDB 865664 D01v01, variability SAR tests were not performed since the measured SAR results for all frequency bands were less than 0.8 W/kg. Please see Section 14 for variability analysis information.
9. 1g SAR : For Back side, the device was tested at a distance of 8 mm at the center of the device. For Front side, the device was tested at a distance of 8mm from the outer ends of the device. The remaining surface or edges within 25 mm of Tx antenna were tested at a distance of 10 mm.

   10g SAR: For Back side, the device was test at a distance of 0 mm at the center. If the 10g SAR > 2.5 W/kg, the device was additionally tested bottom end touching the phantom as well as the top end touching the phantom. For Front side, the device was tested at a distance of 0 mm at the outer ends of the device. The remaining surface or edge within 25 mm of a Tx antenna were tested at a distance of 0mm.

GSM/GPRS Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. This device supports GSM VOIP in the head and body-worn configurations; therefore GPRS was additionally evaluated for head and body-worn compliance.
3. Justification for reduced test configurations per KDB 941225 D03v01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power was evaluated for SAR.
4. Per FCC KDB 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is 1/2 dB, instead of the middle channel, the highest output power channel must be used.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB 248227 D01v01r02 and Oct. 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11 g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB 248227 D01v01r02 and Oct. 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11 n 20MHz and 40 MHz bandwidths) were not investigated since the average output power over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data of IEEE 802.11a mode.
3. Per Apr. 2013 TCB Workshop notes, full SAR test for all IEEE 802.11 ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11 a mode. IEEE 802.11 ac was evaluated for the highest IEEE 802.11 a configuration in each 5 GHz band and exposure condition.
4. When wireless router is enabled, 5.2, 5.3 and 5.5 GHz bands are disabled.
5. This device can operate in the 2.4 GHz and 5.8 GHz bands using WIFI Direct Go capability. Per FCC KDB 941225, 5.8 GHz WIFI Direct Go is evaluated for SAR using wireless router SAR evaluation procedures.
6. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel was $\leq$ 1.6 W/kg and the reported 1g averaged SAR was $<$ 0.8 W/kg, SAR testing on other default channels was not required.
7. Per FCC KDB Publication 648474 D03-D04, this device is considered a “phablet” since its diagonal distance, 170.1 mm, is greater than 160 mm. Therefore hand SAR tests are required. Because wireless router operations are not supported for 5 GHz NII WIFI, hand SAR was evaluated for 5 GHz NII WIFI. However, hand SAR was not evaluated for 2.4 GHz WIFI and 5 GHz DTS WIFI since Hotspot SAR for 2.4 GHz WIFI and 5 GHz DTS WIFI were < 1.2 W/kg.”
8. 5GHz Wifi Direct GO is supported in the 5.8 Ghz band only. The manufacturer expects 5.8 GHz Wifi Direct GO may be used similar to wireless router usage. Therefore, 5.8 GHz Wifi Direct GO was evaluated for SAR similar to wireless router SAR procedures in FCC KDB Publication 941225.

14. SAR Measurement Variability and Uncertainty

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Note(s):
1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
2. Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg.

15. SAR Summation Scenario

	Position	Applicable Combination	Note
Simultaneous Transmission	Head	GSM 850 Voice/Data + 2.4 GHz WiFi	
		GSM 1900 Voice/Data + 2.4 GHz WiFi	
		GSM 850 Voice/Data + 5 GHz WiFi	
		GSM 1900 Voice/Data + 5 GHz WiFi	
		WCDMA850 Voice +5 GHz WiFi	
	Hotspot	GPRS 850 Data + 2.4 GHz WiFi	
		GPRS 1900 Data + 2.4 GHz WiFi	
		GPRS 850 Data + 5 GHz WiFi	Wifi Direct GO
		GPRS 1900 Data + 5 GHz WiFi	

	Position	Applicable Combination	Note
Simultaneous Transmission	Body-worn	GSM 850 Voice/Data + 2.4 GHz WiFi	
		GSM 1900 Voice/Data + 2.4 GHz WiFi	
		GSM 850 Voice/Data + 5 GHz WiFi	
		GSM 1900 Voice/Data + 5 GHz WiFi	
		GSM 850 Voice + 2.4 GHz Bluetooth	
		GSM 1900 Voice + 2.4 GHz Bluetooth	
* BT and WLAN are not simultaneous transmission.			

15.1 Simultaneous Transmission Summation for Head

Simultaneous Transmission Summation with 2.4 GHz WIFI

Band	configuration	Scaled SAR (W/kg)	2.4 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Left Cheek	0.184	0.109	0.293
	Left Tilt	0.106	0.082	0.188
	Right Cheek	0.152	0.302	0.454
	Right Tilt	0.119	0.167	0.286
GPRS 850	Left Cheek	0.205	0.109	0.314
	Left Tilt	0.115	0.082	0.197
	Right Cheek	0.173	0.302	0.475
	Right Tilt	0.131	0.167	0.298
GSM 1900	Left Cheek	0.164	0.109	0.273
	Left Tilt	0.068	0.082	0.150
	Right Cheek	0.215	0.302	0.517
	Right Tilt	0.108	0.167	0.275
GPRS 1900	Left Cheek	0.226	0.109	0.335
	Left Tilt	0.092	0.082	0.174
	Right Cheek	0.295	0.302	0.597
	Right Tilt	0.138	0.167	0.305

Simultaneous Transmission Summation with 5 GHz WIFI

Band	configuration	Scaled SAR (W/kg)	5 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM850	Left Cheek	0.184	0.116	0.300
	Left Tilt	0.106	0.092	0.198
	Right Cheek	0.152	0.298	0.450
	Right Tilt	0.119	0.232	0.351
GPRS 850	Left Cheek	0.205	0.116	0.321
	Left Tilt	0.115	0.092	0.207
	Right Cheek	0.173	0.298	0.471
	Right Tilt	0.141	0.232	0.373
GSM 1900	Left Cheek	0.164	0.116	0.280
	Left Tilt	0.068	0.092	0.160
	Right Cheek	0.215	0.298	0.513
	Right Tilt	0.108	0.232	0.340
GPRS 1900	Left Cheek	0.226	0.116	0.342
	Left Tilt	0.092	0.092	0.184
	Right Cheek	0.295	0.298	0.593
	Right Tilt	0.138	0.232	0.370

15.2 Simultaneous Transmission Summation for Body-Worn

Simultaneous Transmission Summation with 2.4 GHz WIFI (1 cm)

Band	configuration	Scaled SAR (W/kg)	2.4 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Rear	0.241	0.160	0.401
GSM 1900	Rear	0.686	0.160	0.846

Simultaneous Transmission Summation with 5 GHz WIFI (1 cm)

Band	configuration	Scaled SAR (W/kg)	5 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Rear	0.241	0.216	0.457
GSM 1900	Rear	0.686	0.216	0.902

Simultaneous Transmission Summation with Bluetooth (1 cm)

Band	configuration	Scaled SAR (W/kg)	BT SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Rear	0.241	0.17	0.411
GSM 1900	Rear	0.686	0.17	0.856

15.3 Simultaneous Transmission Summation for Hotspot

Simultaneous Transmission Summation with 2.4 GHz WIFI (1 cm)

Band	configuration	Scaled SAR (W/kg)	2.4 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Rear	0.241	0.160	0.401
	Front	0.385	0.073	0.458
	Left	0.359	0.113	0.472
	Right	0.359		0.375
	Bottom	0.194		0.194
	Top		0.016	0.016
GSM 1900	Rear	0.686	0.160	0.846
	Front	0.703	0.073	0.776
	Left	0.190	0.113	0.303
	Right	0.208		0.208
	Bottom	0.463		0.463
	Top		0.016	0.016

Simultaneous Transmission Summation with 5.8 GHz DTS Wifi (1 cm)

Band	configuration	Scaled SAR (W/kg)	5 GHz WIFI Scaled SAR (W/kg)	∑ 1-g SAR (W/kg)
GSM 850	Rear	0.241	0.178	0.419
	Front	0.385	0.095	0.480
	Left	0.359	0.144	0.503
	Right	0.359		0.359
	Bottom	0.194		0.194
	Top		0.074	0.074
GSM 1900	Rear	0.686	0.178	0.864
	Front	0.703	0.095	0.798
	Left	0.190	0.144	0.334
	Right	0.208		0.208
	Bottom	0.463		0.463
	Top		0.074	0.074

15.4 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05

16. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 1992.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

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Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.4 ℃
Ambient Temperature:	20.6 ℃
Test Date:	Nov.12, 2013
Plot No.	1

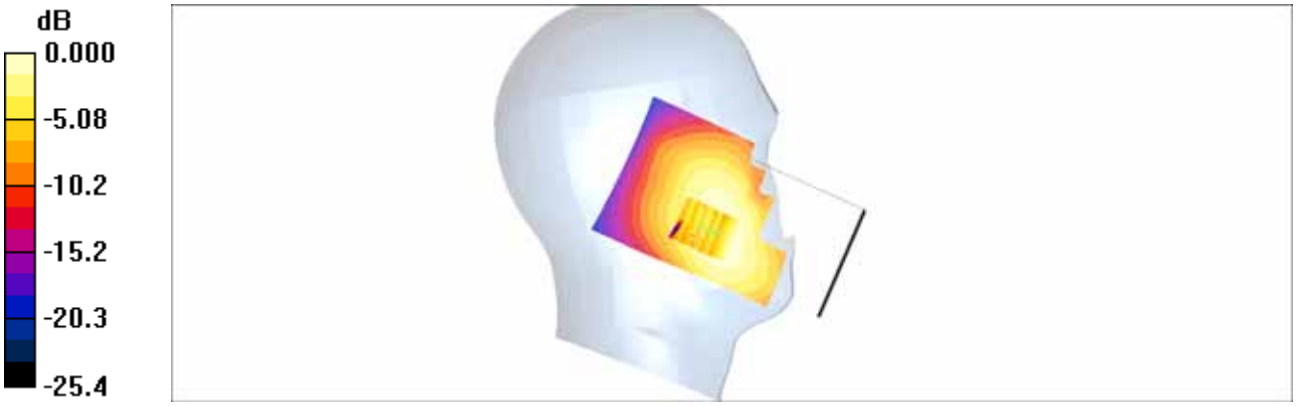
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.77
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.919 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(6.56, 6.56, 6.56); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 GPRS 3Tx Left Touch 190/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.217 mW/g

GSM850 GPRS 3Tx Left Touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.27 V/m; Power Drift = -0.163 dB
Peak SAR (extrapolated) = 0.266 W/kg
SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.215 mW/g



0 dB = 0.215mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.6 ℃
Ambient Temperature:	20.8 ℃
Test Date:	Nov.14, 2013
Plot No.	2

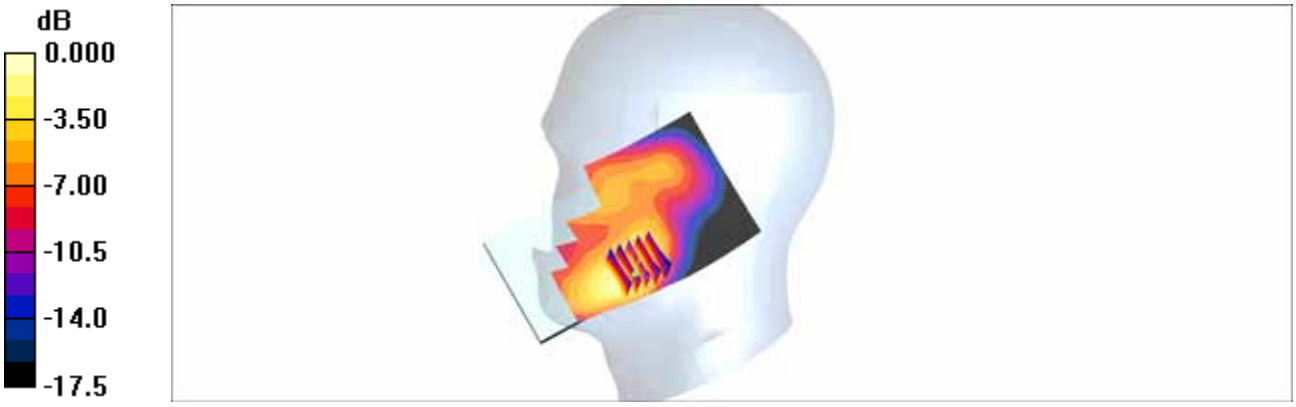
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.35 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(5.28, 5.28, 5.28); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 GPRS 2TX Right Touch 661/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

GSM1900 GPRS 2TX Right Touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.85 V/m; Power Drift = -0.167 dB
Peak SAR (extrapolated) = 0.390 W/kg
SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.162 mW/g
Maximum value of SAR (measured) = 0.294 mW/g



0 dB = 0.294mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	Nov.18, 2013
Plot No.	3

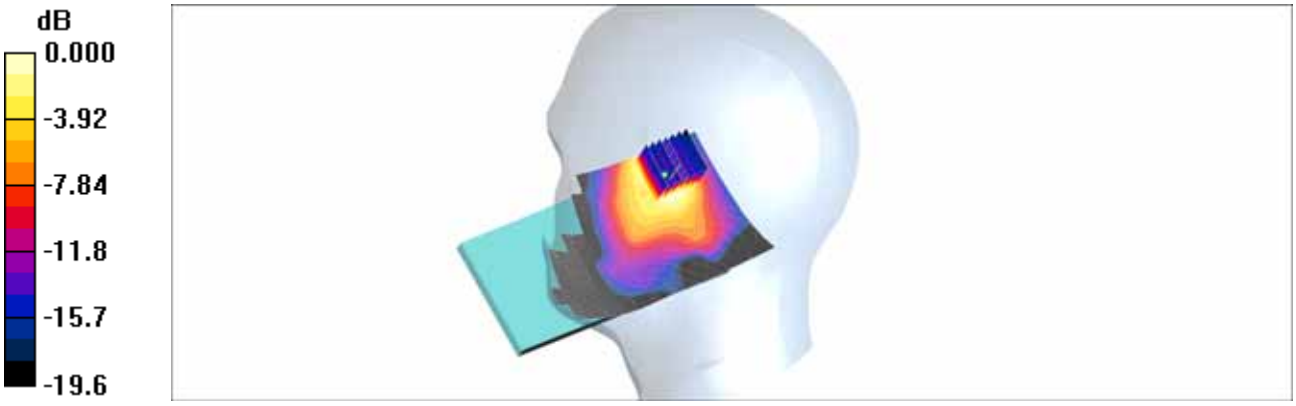
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.81 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(7.08, 7.08, 7.08); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 835/900 Phamtom ; Type: SAM

802.11b Right Touch 1Mbps 6/Area Scan (81x151x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.432 mW/g

802.11b Right Touch 1Mbps 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.22 V/m; Power Drift = 0.093 dB
Peak SAR (extrapolated) = 0.568 W/kg
SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.128 mW/g
Maximum value of SAR (measured) = 0.295 mW/g



0 dB = 0.295mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	Nov.19, 2013
Plot No.	4

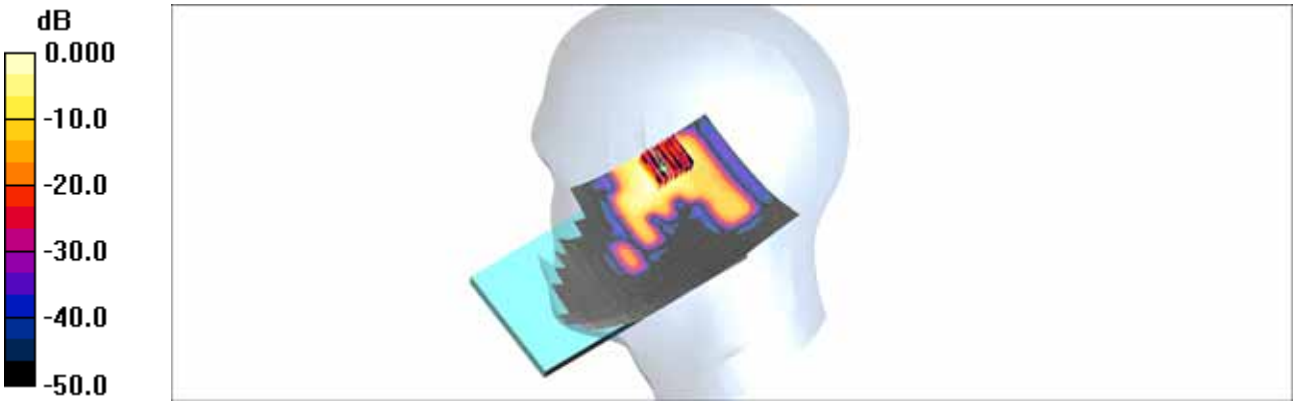
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.14 mho/m; ε_r = 34.6; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.7, 4.7, 4.7); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

802.11a Right touch 149ch 6Mbps/Area Scan (101x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.463 mW/g

802.11a Right touch 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.49 V/m; Power Drift = -0.106 dB
Peak SAR (extrapolated) = 0.964 W/kg
SAR(1 g) = 0.213 mW/g; SAR(10 g) = 0.072 mW/g
Maximum value of SAR (measured) = 0.448 mW/g



0 dB = 0.448mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	Nov.19, 2013
Plot No.	5

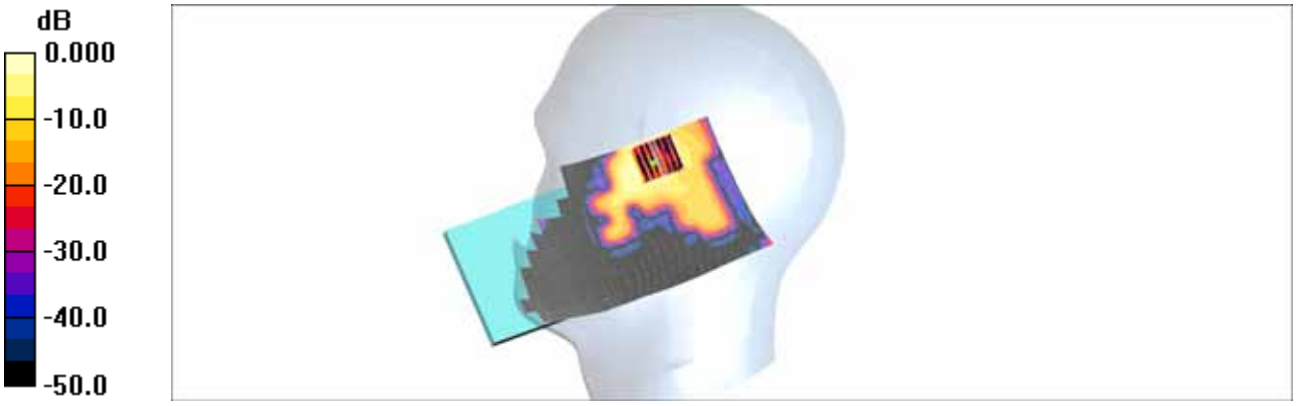
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 4.82 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.81, 4.81, 4.81); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 1800/1900 Phantom; Type: SAM

802.11a Right touch 100ch 6Mbps/Area Scan (101x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.475 mW/g

802.11a Right touch 100ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.44 V/m; Power Drift = 0.141 dB
Peak SAR (extrapolated) = 0.924 W/kg
SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.080 mW/g
Maximum value of SAR (measured) = 0.447 mW/g



0 dB = 0.447mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	Nov.13, 2013
Plot No.	6

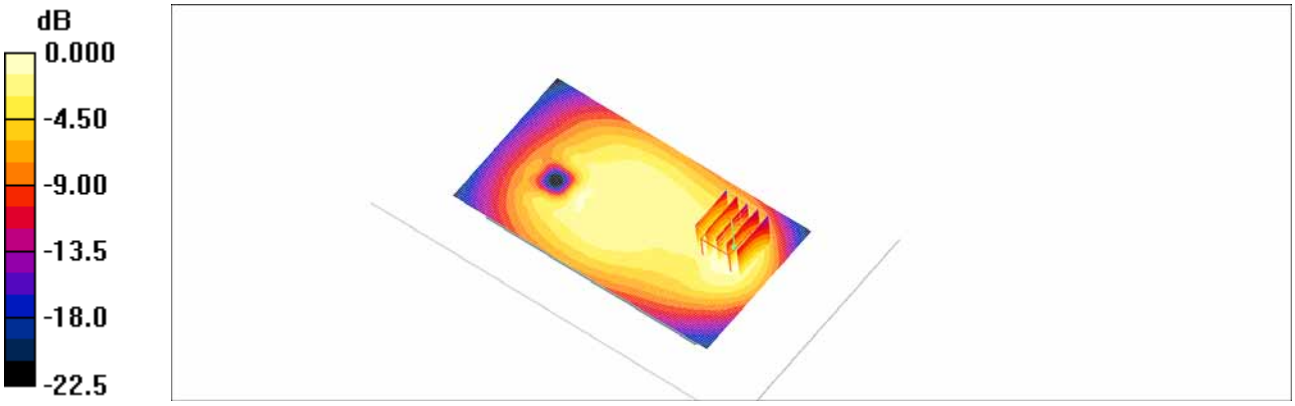
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.77
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.982 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(6.32, 6.32, 6.32); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

GSM850 Body Rear GPRS 3Tx 190/Area Scan (71x131x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.278 mW/g

GSM850 Body Rear GPRS 3Tx 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.9 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 0.427 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.148 mW/g
Maximum value of SAR (measured) = 0.255 mW/g



0 dB = 0.255mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.3 ℃
Test Date:	Nov.13, 2013
Plot No.	7

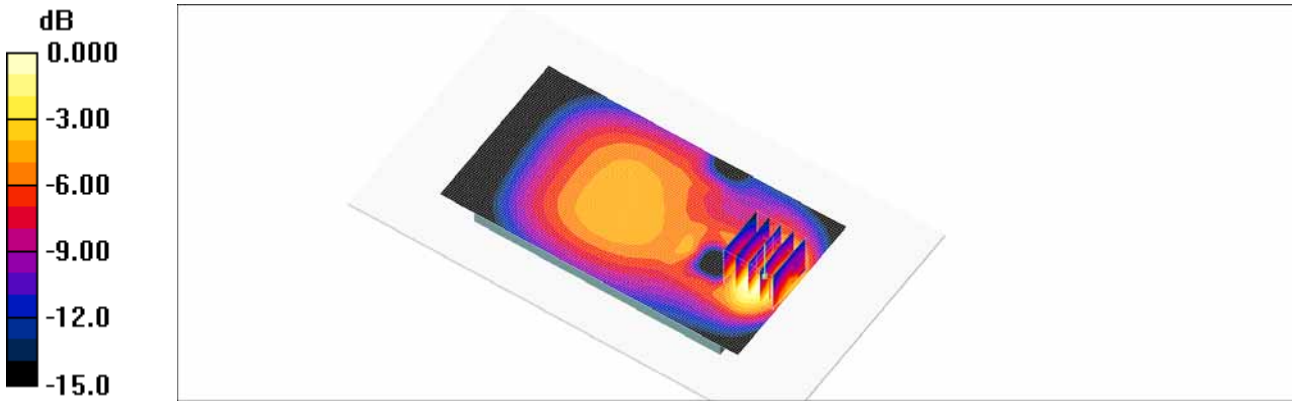
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:2.77
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.982 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(6.32, 6.32, 6.32); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

GSM850 Body Front GPRS 3Tx 190/Area Scan (71x131x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.447 mW/g

GSM850 Body Front GPRS 3Tx 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.661 W/kg
SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.214 mW/g
Maximum value of SAR (measured) = 0.422 mW/g



0 dB = 0.422mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.4 ℃
Ambient Temperature:	20.6 ℃
Test Date:	Nov.15, 2013
Plot No.	8

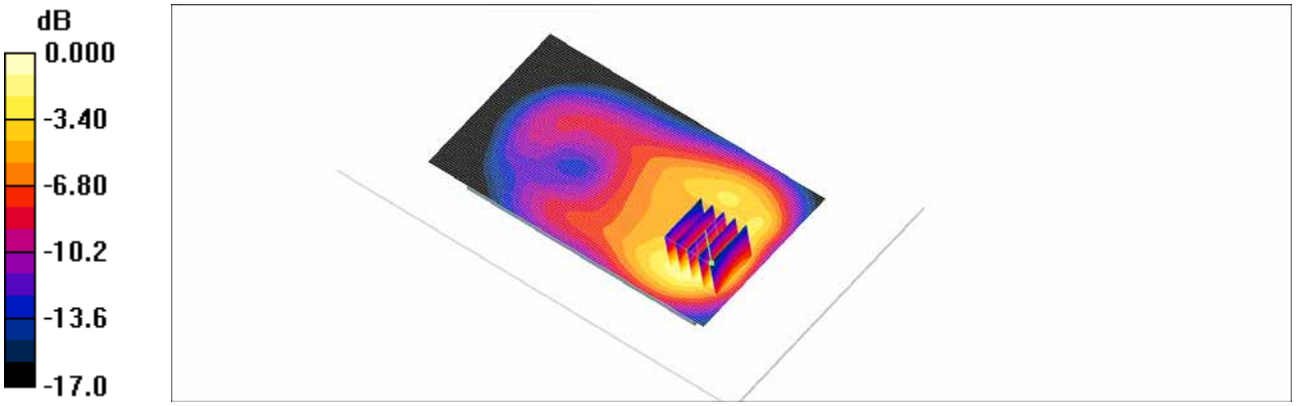
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(4.73, 4.73, 4.73); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

GSM1900 Body Rear GPRS 2Tx 661/Area Scan (71x131x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.630 mW/g

GSM1900 Body Rear GPRS 2Tx 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.626 mW/g; SAR(10 g) = 0.352 mW/g
Maximum value of SAR (measured) = 0.688 mW/g



0 dB = 0.688mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.4 ℃
Ambient Temperature:	20.6 ℃
Test Date:	Nov.15, 2013
Plot No.	9

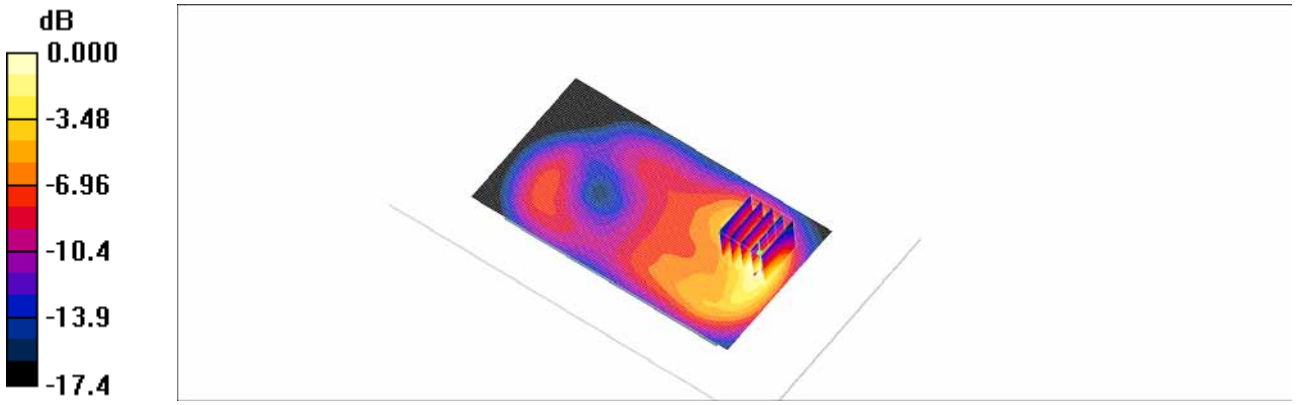
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: ET3DV6 - SN1630; ConvF(4.73, 4.73, 4.73); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

GSM1900 Body Front GPRS 2Tx 661/Area Scan (71x131x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.636 mW/g

GSM1900 Body Front GPRS 2Tx 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.91 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.641 mW/g; SAR(10 g) = 0.333 mW/g
Maximum value of SAR (measured) = 0.673 mW/g



0 dB = 0.673mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	Nov.18, 2013
Plot No.	10

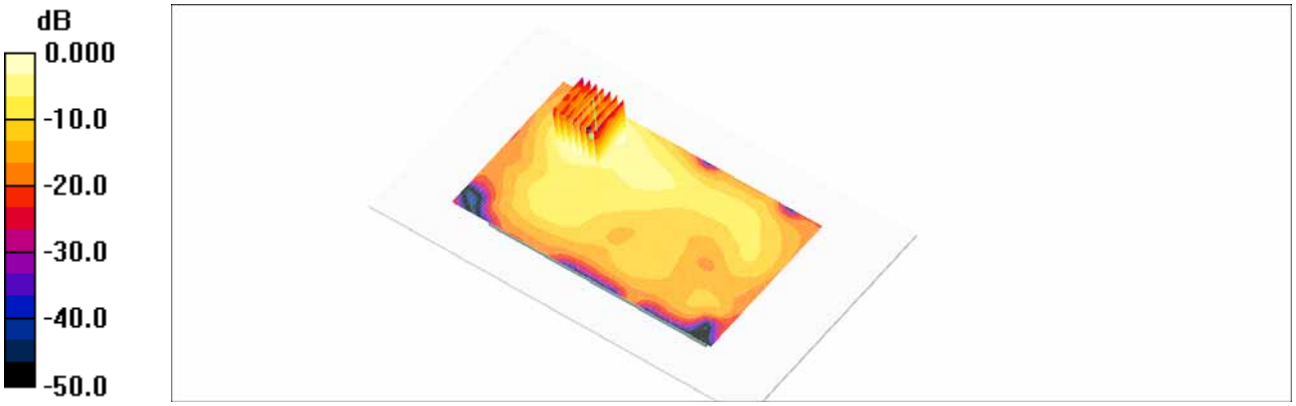
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(7.04, 7.04, 7.04); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

WIFI2450 Body rear 1Mbps 6ch/Area Scan (91x161x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.213 mW/g

WIFI2450 Body rear 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.84 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.217 mW/g



0 dB = 0.217mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.5 ℃
Ambient Temperature:	20.7 ℃
Test Date:	Nov.20, 2013
Plot No.	11

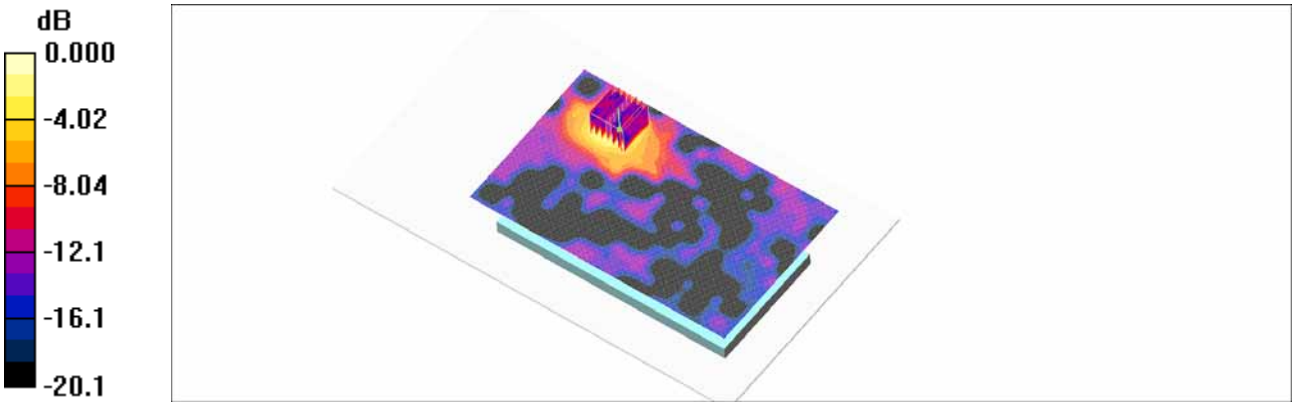
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.03 mho/m; ε_r = 46.3; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.95, 3.95, 3.95); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11a Body Rear 149ch 6Mbps/Area Scan (111x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.227 mW/g

802.11a Body Rear 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.36 V/m; Power Drift = -0.197 dB
Peak SAR (extrapolated) = 0.597 W/kg
SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.045 mW/g
Maximum value of SAR (measured) = 0.238 mW/g



0 dB = 0.238mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.5 ℃
Ambient Temperature:	20.7 ℃
Test Date:	Nov.20, 2013
Plot No.	12

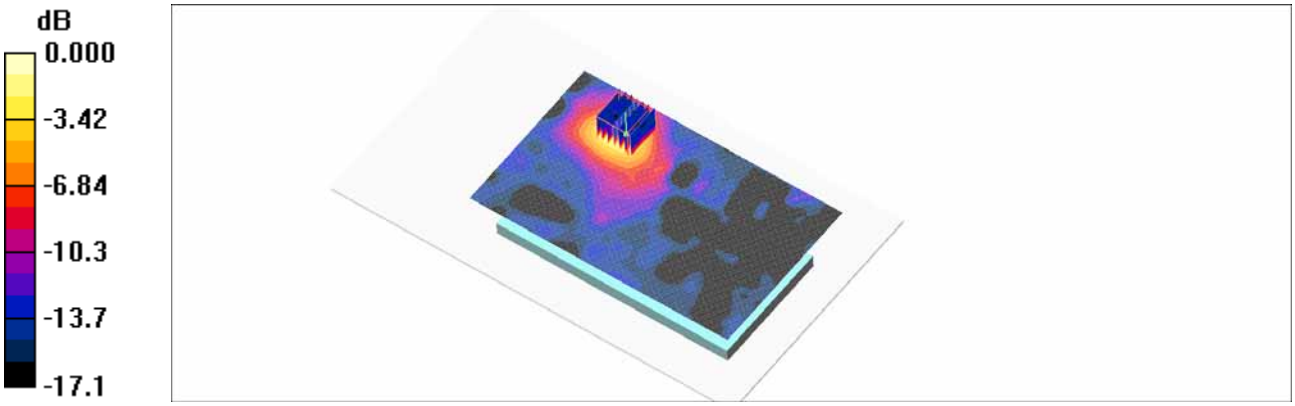
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.68 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11a Body Rear 100ch 6Mbps/Area Scan (111x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.326 mW/g

802.11a Body Rear 100ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.27 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.067 mW/g
Maximum value of SAR (measured) = 0.326 mW/g



0 dB = 0.326mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE Phone with Bluetooth, WLAN and RFID
Liquid Temperature:	20.5 ℃
Ambient Temperature:	20.7 ℃
Test Date:	Nov.20, 2013
Plot No.	13

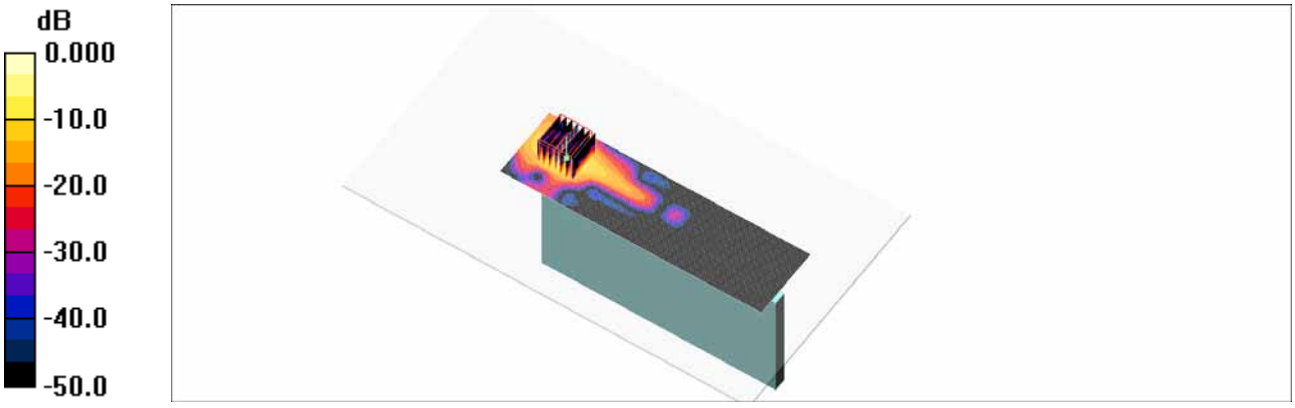
DUT: LG-D955; Type: Bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.68 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11a Hand SAR Left Side 100ch 6Mbps/Area Scan (51x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.78 mW/g

802.11a Hand SAR Left Side 100ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.78 V/m; Power Drift = 0.129 dB
Peak SAR (extrapolated) = 8.95 W/kg
SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.281 mW/g
Maximum value of SAR (measured) = 3.64 mW/g



0 dB = 3.64mW/g

Attachment 2. – Dipole Verification Plots

■ Verification Data (835 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.4 ℃
Test Date:	Nov.12, 2013

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

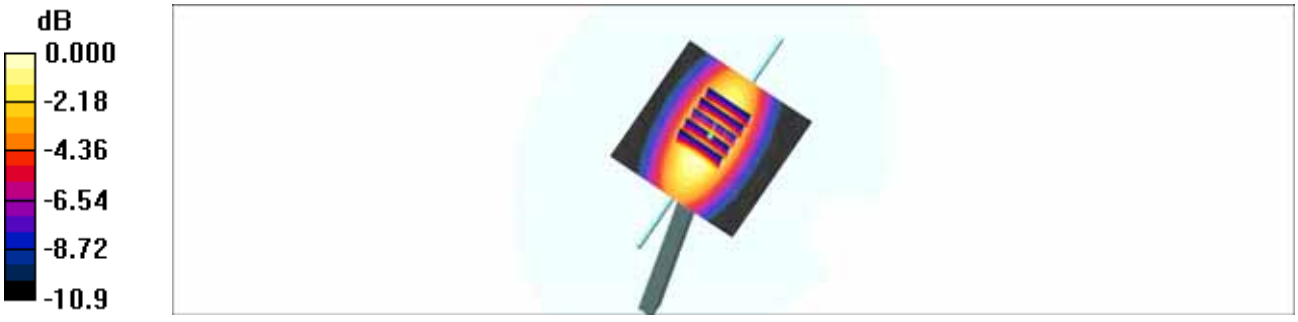
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.918 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.56, 6.56, 6.56); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Verification 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.2 V/m; Power Drift = 0.000 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.621 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

■ Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 20.1 ℃
Test Date: Nov.13, 2013

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

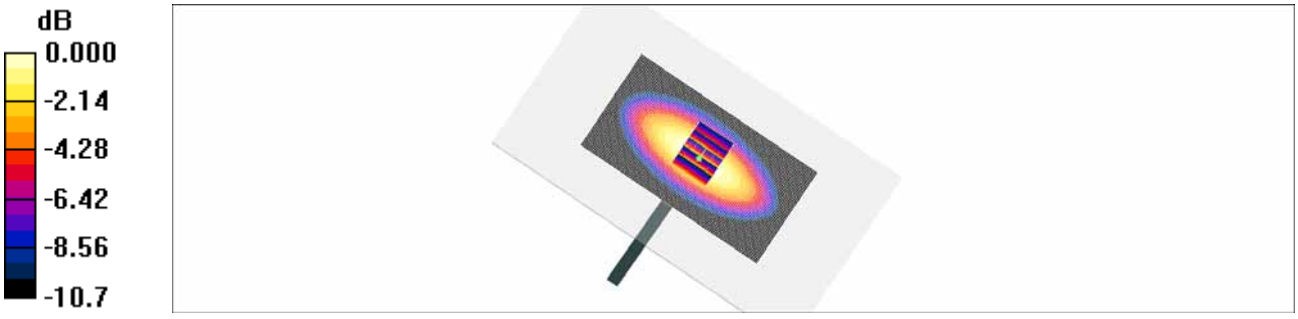
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.32, 6.32, 6.32); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 835 MHz/Area Scan (111x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Verification 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.3 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.640 mW/g
Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 1.06mW/g

■ Verification Data (1 900 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.6 ℃
Test Date:	Nov.14, 2013

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032

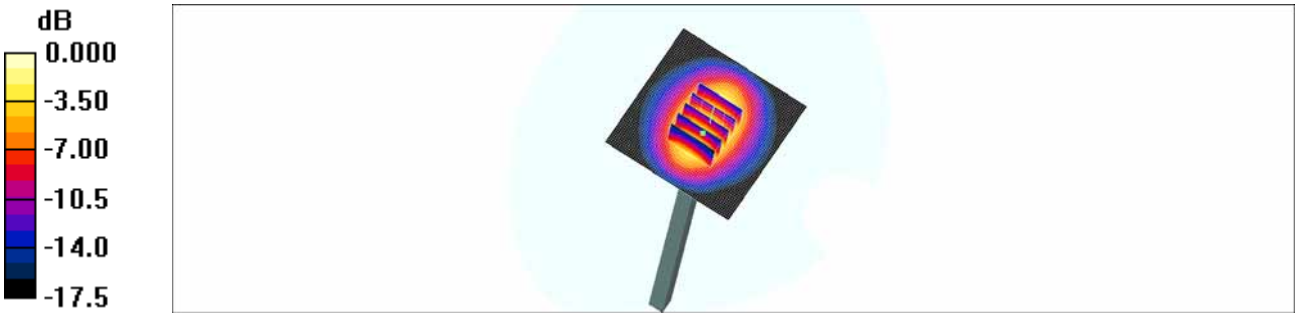
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.37 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.28, 5.28, 5.28); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-02-21
- Phantom: SAM 835/900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 1900MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.55 mW/g

Verification 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.3 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 6.48 W/kg
SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.29 mW/g
Maximum value of SAR (measured) = 4.51 mW/g



0 dB = 4.51mW/g

■ Verification Data (1 900 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.4 ℃
Test Date:	Nov.15, 2013

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d032

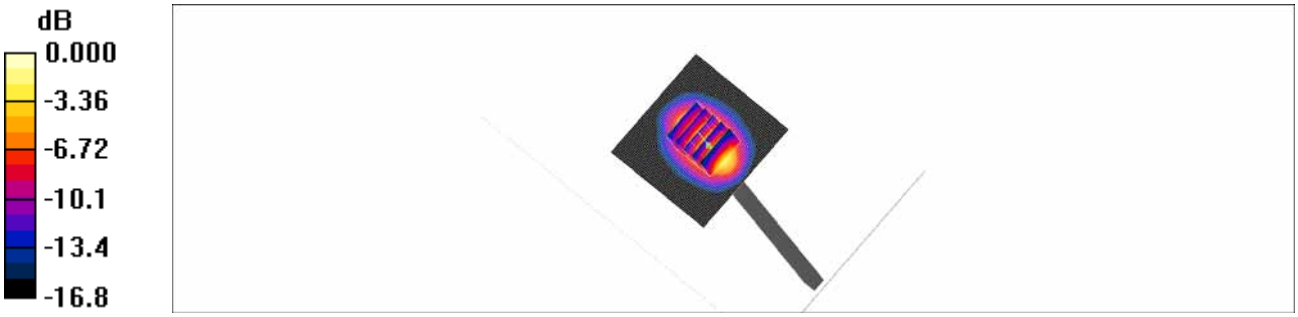
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.48 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.73, 4.73, 4.73); Calibrated: 2013-01-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.20 mW/g

Verification 1900 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 58.9 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 7.02 W/kg
SAR(1 g) = 4.21 mW/g; SAR(10 g) = 2.28 mW/g
Maximum value of SAR (measured) = 4.70 mW/g



0 dB = 4.70mW/g

■ Verification Data (2 450 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.2 ℃
Test Date:	Nov.18, 2013

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743

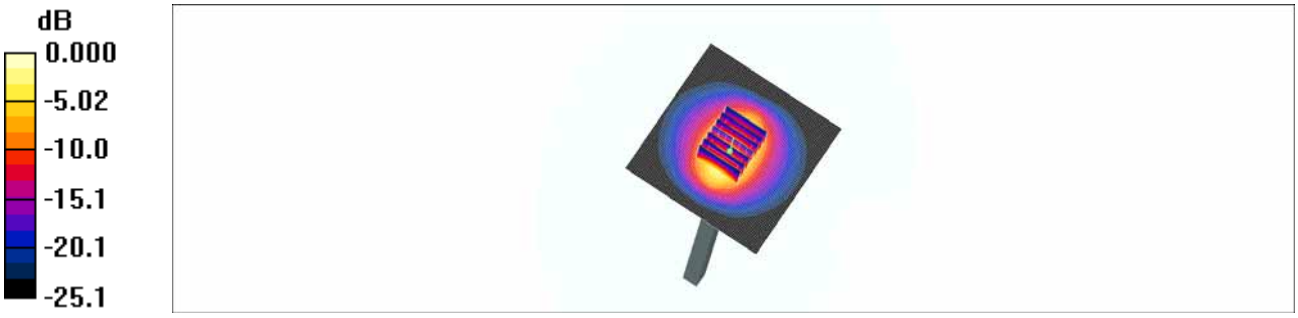
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.08, 7.08, 7.08); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: 835/900 Phamtom ; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.20 mW/g

Verification 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.7 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.16 mW/g; SAR(10 g) = 2.28 mW/g
Maximum value of SAR (measured) = 8.19 mW/g



0 dB = 8.19mW/g

■ Verification Data (2 450 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.2 ℃
Test Date:	Nov.18, 2013

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743

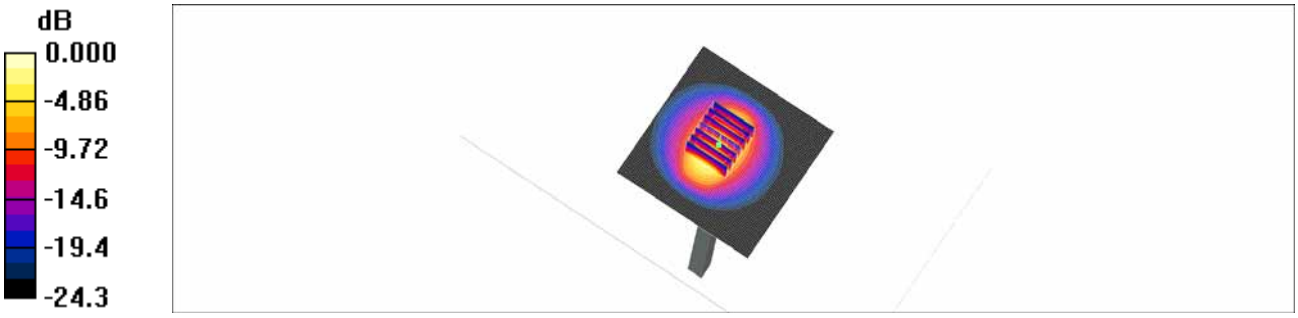
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.04, 7.04, 7.04); Calibrated: 2013-07-31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.19 mW/g

Verification 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.1 V/m; Power Drift = -0.104 dB
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 8.05 mW/g



0 dB = 8.05mW/g

■ Verification Data (5 200 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	Nov.19, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

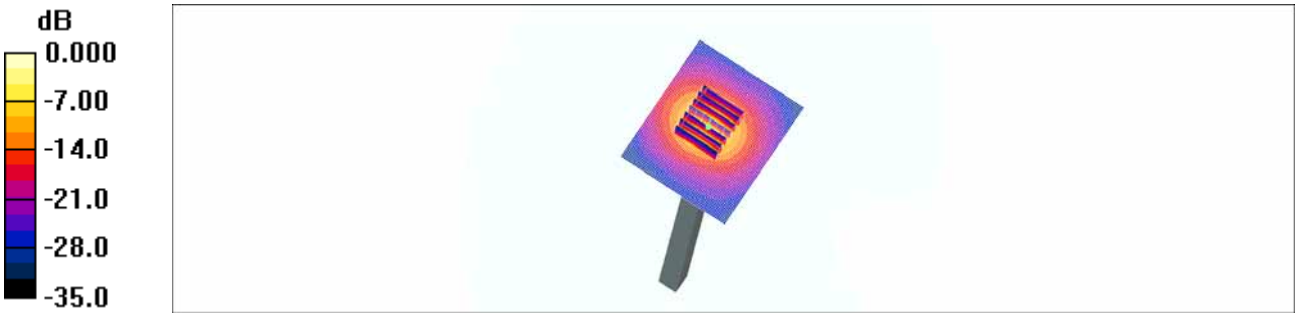
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.5 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(5.11, 5.11, 5.11); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Validation 5200MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.82 mW/g

Validation 5200MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 42.9 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 8.28 mW/g; SAR(10 g) = 2.31 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

■ Verification Data (5 200 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.5 ℃
Test Date:	Nov.20, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

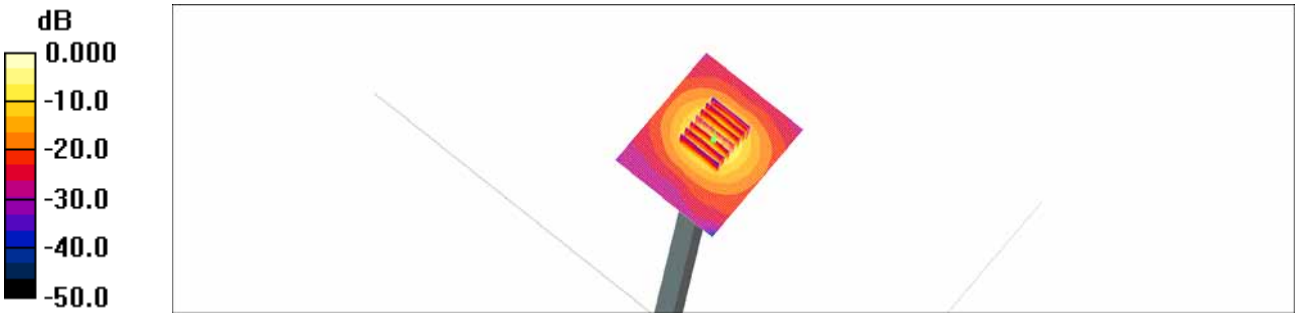
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.17 mho/m; ε_r = 47.6; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.49, 4.49, 4.49); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Validation 5200MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.88 mW/g

Validation 5200MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 39.0 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.73 mW/g; SAR(10 g) = 2.19 mW/g
Maximum value of SAR (measured) = 15.9 mW/g



0 dB = 15.9mW/g

■ Verification Data (5 300 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	Nov.19, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

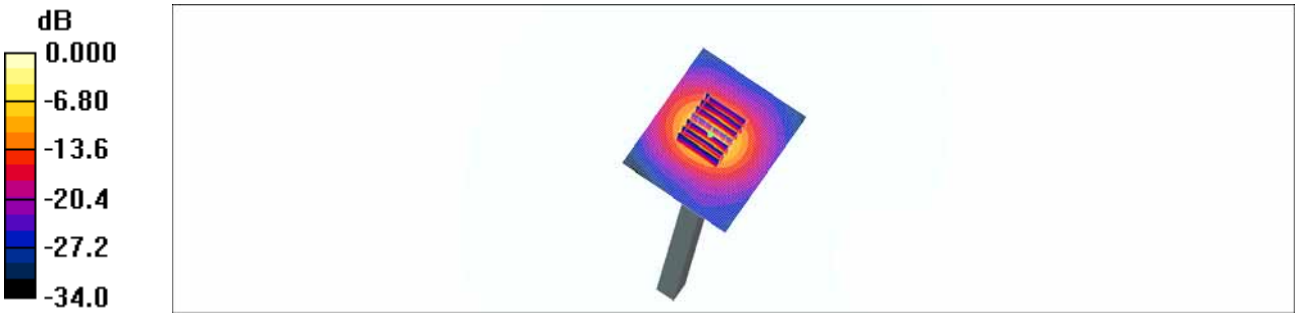
Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 4.65 mho/m; ε_r = 35.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.83, 4.83, 4.83); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5300MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.09 mW/g

Verification 5300MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 40.9 V/m; Power Drift = 0.058 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 7.7 mW/g; SAR(10 g) = 2.15 mW/g
Maximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4mW/g

■ Verification Data (5 300 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.5 ℃
Test Date:	Nov.20, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

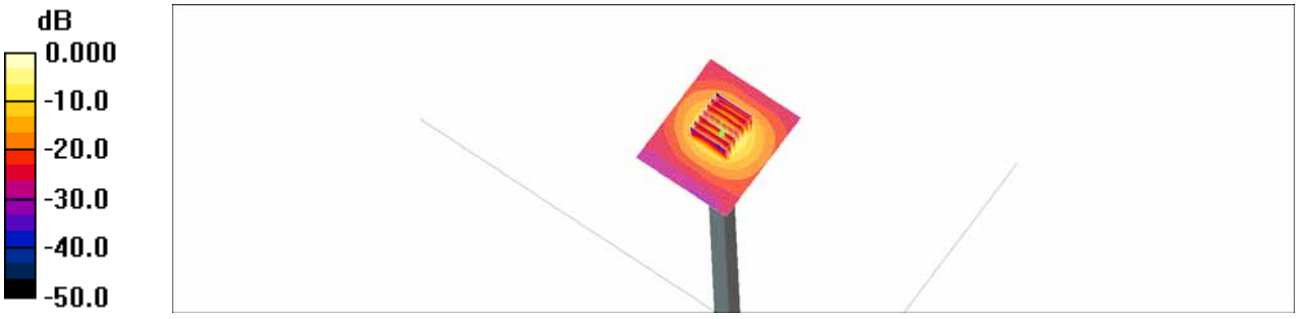
Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.34 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.14, 4.14, 4.14); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Validation 5300MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.52 mW/g

Validation 5300MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.3 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 29.6 W/kg
SAR(1 g) = 7.3 mW/g; SAR(10 g) = 2.08 mW/g
Maximum value of SAR (measured) = 15.0 mW/g



0 dB = 15.0mW/g

■ Verification Data (5 500 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	Nov.19, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

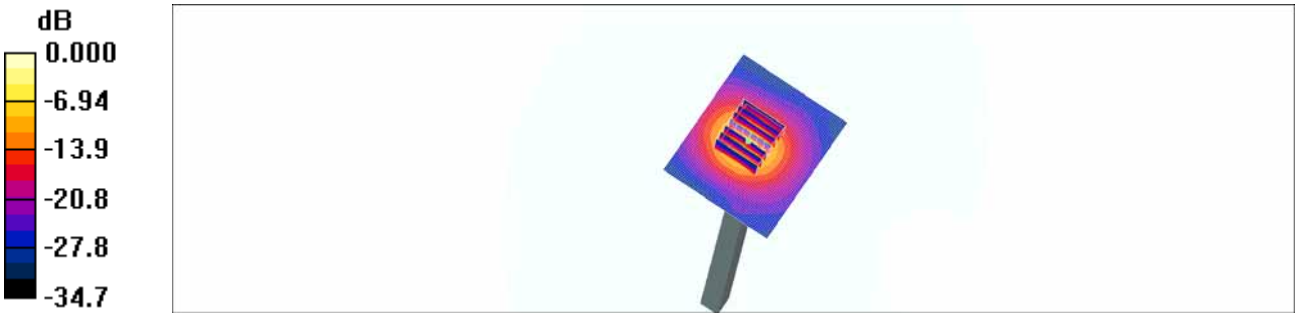
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 4.82 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.81, 4.81, 4.81); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.66 mW/g

Verification 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.7 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 36.4 W/kg
SAR(1 g) = 8.02 mW/g; SAR(10 g) = 2.21 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

■ Verification Data (5 500 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.5 ℃
Test Date:	Nov.20, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

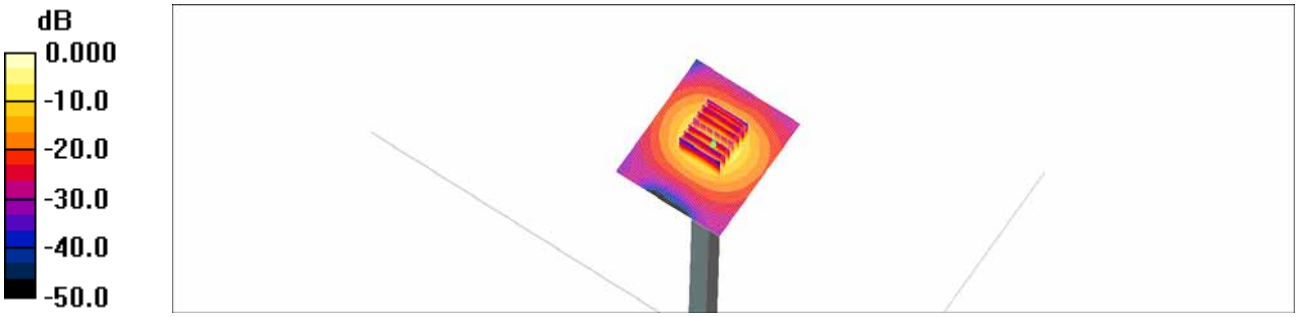
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.68 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.17 mW/g

Verification 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.5 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 34.3 W/kg
SAR(1 g) = 8.12 mW/g; SAR(10 g) = 2.31 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

■ Verification Data (5 600 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	Nov.19, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

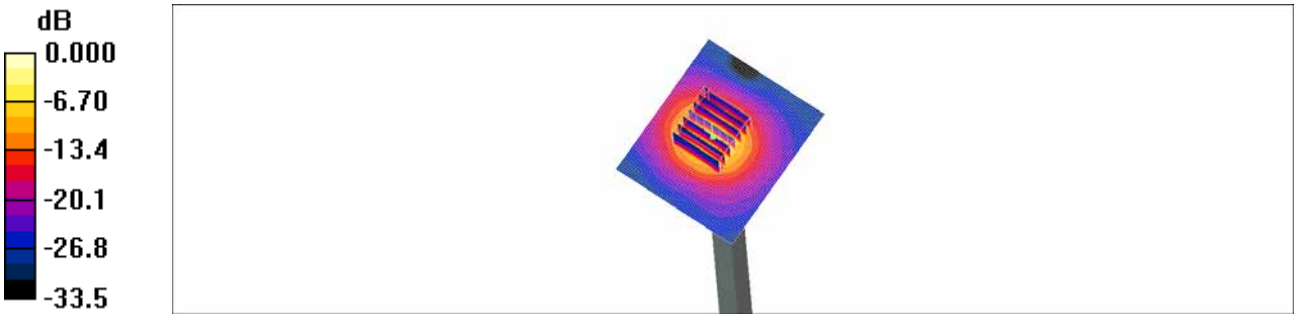
Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 4.92 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.44, 4.44, 4.44); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5600MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.75 mW/g

Verification 5600MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 40.4 V/m; Power Drift = -0.175 dB
Peak SAR (extrapolated) = 34.8 W/kg
SAR(1 g) = 8.16 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 16.7 mW/g



0 dB = 16.7mW/g

■ Verification Data (5 600 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.5 ℃
Test Date:	Nov.20, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

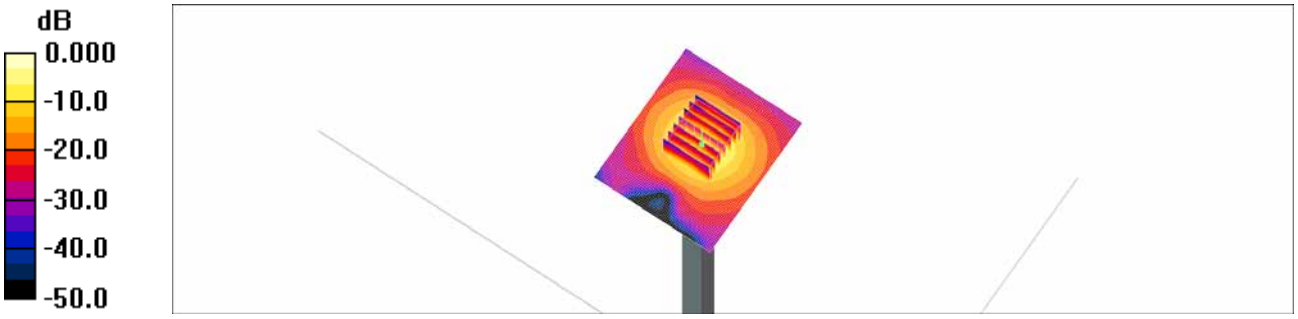
Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.79 mho/m; ε_r = 46.7; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.6, 3.6, 3.6); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.52 mW/g

Verification 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.7 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 34.5 W/kg
SAR(1 g) = 8.17 mW/g; SAR(10 g) = 2.31 mW/g
Maximum value of SAR (measured) = 17.6 mW/g



0 dB = 17.6mW/g

■ Verification Data (5 800 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.1 ℃
Test Date:	Nov.19, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

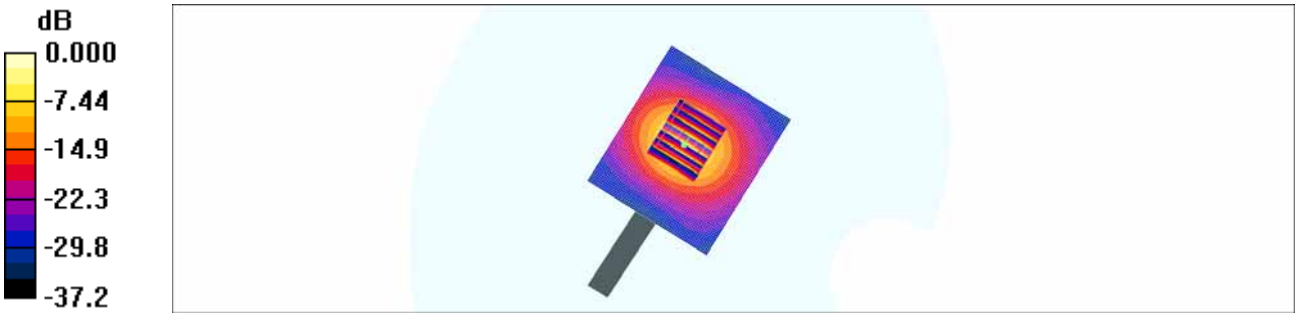
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.19 mho/m; ε_r = 34.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.7, 4.7, 4.7); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: SAM 1800/1900 MHz; Type: SAM;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5800MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.85 mW/g

Verification 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.4 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 36.6 W/kg
SAR(1 g) = 7.77 mW/g; SAR(10 g) = 2.18 mW/g
Maximum value of SAR (measured) = 15.7 mW/g



0 dB = 15.7mW/g

■ Verification Data (5 800 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	20.5 ℃
Test Date:	Nov.20, 2013

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

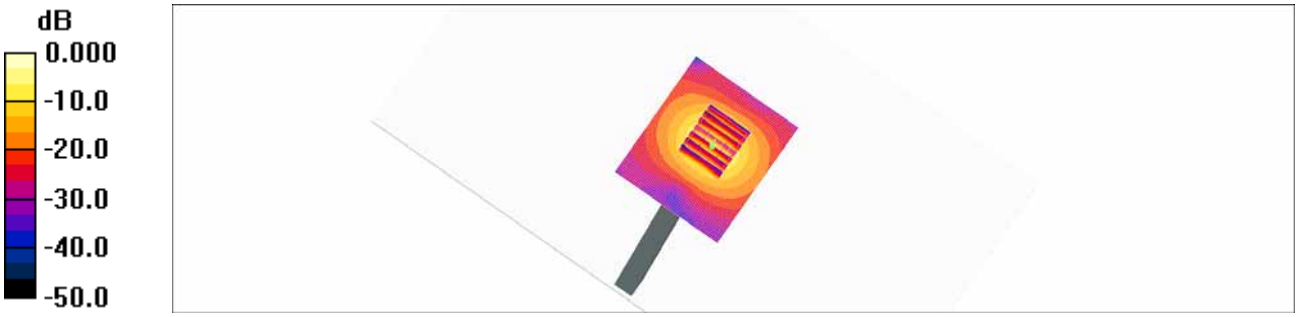
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.98 mho/m; ε_r = 46.3; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.95, 3.95, 3.95); Calibrated: 2013-07-31
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2013-01-16
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA;
- Measurement SW: DASY4, V4.7 Build 80;

Verification 5800MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.52 mW/g

Verification 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 36.6 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 34.5 W/kg
SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 16.5 mW/g



0 dB = 16.5mW/g