SAR TEST REPORT

HCT CO., LTD

EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
FCC ID:	ZNFLS840
Model:	LS840
Date of Issue:	Jul.30 , 2012
Test report No.:	HCTA1207FS03
Test Laboratory:	**HCT CO., LTD.** 105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811 TEL: +82 31 645 6485 FAX: +82 31 645 6401
Applicant :	**LG Electronics, Inc.** 60-39, Gasan-Dong, Gumchon-Gu, Seoul 153-023, Korea
Testing has been carried out in accordance with:	RSS-102 Issue 4; Health Canada Safety Code 6 47CFR §2.1093 FCC OET Bulletin 65(Edition 97-01), Supplement C (Edition 01-01) 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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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 2. 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. 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).

2.1 General Information

EUT Type	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN		
FCC ID:	ZNFLS840		
Model:	LS840, LGLS840, LG-LS840		
Trade Name	LG	Serial Number(s)	#1
Mode(s)of Operation	BC0/ BC1/ BC10 /802.11bgn/LTE Band25		
Application Type	Permissive Change Class II		
Tx Frequency	1850-1915 MHz (LTE Band25)		
Rx Frequency	1930 –1995 MHz (LTE Band25)		
FCC Classification	Licensed Portable Transmitter Held to Ear (PCE)/ DSS/ DTS		
Production Unit	Prototype		

Max SAR

Band	1g SAR (W/kg)		
	Head	Body-worn	Hotspot
LTE Band 25	0.669	0.571	0.571

Date(s) of Tests	Jul.7, 2012 ~ Jul.8 , 2012
Antenna Type	Integral Antenna
EVDO	Rev.0, A
Key Features;	Added 10MHz BW for LTE Band25

2.2 KDB 941225 LTE information

<table>
<tr><th>#</th><th>Description</th><th>Parameter</th></tr>
<tr><td>1</td><td>Identify the operating grequency range of each LTE Transmission band used by the device</td><td>Band 25: 1852.5-1912.5 MHz</td></tr>
<tr><td>2</td><td>Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc</td><td>Band 25:10 MHz</td></tr>
<tr><td>3</td><td>Identify the high, middle and low channel numbers and frequencies in each LTE frequency band</td><td>Please refer to section 9.3</td></tr>
<tr><td>4</td><td>Specify the UE category and uplink modulations used</td><td>The UE Category is 3/ QPSK, 16QAM</td></tr>
<tr><td>5</td><td>Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.</td><td>Please refer to the antenna description and distance at section 10.</td></tr>
<tr><td>6</td><td>Identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.</td><td>Please refer to Tables in section 10.3.</td></tr>
<tr><td>7</td><td>Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: a) only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled.</td><td>
<table>
<tr><th rowspan="2">Modulation</th><th colspan="2">Channel bandwidth / Transmission bandwidth configuration(RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>5 MHz</th><th>10 MHz</th></tr>
<tr><td>QPSK</td><td>> 8</td><td>> 12</td><td>≤1</td></tr>
<tr><td>16QAM</td><td>≤ 8</td><td>≤ 12</td><td>≤1</td></tr>
<tr><td>16QAM</td><td>> 8</td><td>> 12</td><td>≤2</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band: a) with 1 RB allocated at the upper edge of a channel b) with 1 RB allocated at the lower edge of a channel c) using 50% RB allocation centered within a channel d) using 100% RB allocation</td><td>Refer to section 9 RF output power table.</td></tr>
</table>

<table>
<tr><td>9</td><td>Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes</td><td>Please refer to the tables in section 10.</td></tr>
<tr><td>10</td><td>Include the maximum average conducted output power measured for the other wireless mode and freq. bands</td><td>See section 9 RF output power measurements in SAR report.</td></tr>
<tr><td>11</td><td>Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)</td><td>Please refer to the table in section 11</td></tr>
<tr><td>12</td><td>When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup</td><td>1. Power Reduction operation table for SVDO Mode
<table>
<tr><th>Mode</th><th>CDMA Current Voice Power for BC0, BC1 & BC10
CDMA voice Max Power: 24.3 dBm</th><th>CDMA EVDO Max. Power for BC0 & BC1</th></tr>
<tr><td rowspan="2">SVDO</td><td>P < 15.5 dBm</td><td>23.8 dBm (Limited)</td></tr>
<tr><td>P ≥ 15.5 dBm</td><td>18.8 dBm (Limited)</td></tr>
</table>
2. Power Reduction operation table for SVLTE Mode
<table>
<tr><th>Mode</th><th>CDMA Current Voice Power for BC0, BC1 & BC10</th><th>LTE Max. Power for B25</th></tr>
<tr><td rowspan="2">SVLTE</td><td>P < 18.5 dBm</td><td>23.0 dBm (Limited)</td></tr>
<tr><td>P ≥ 18.5 dBm</td><td>19.0 dBm (Limited)</td></tr>
</table></td></tr>
<tr><td>13</td><td>Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission</td><td>* Power reduction is implemented on EVDO in SVDO mode
* Power reduction is implemented on LTE in SVLTE mode</td></tr>
<tr><td>14</td><td>When appropriate, include a SAR test plan proposal with respect to the above</td><td>Not Applicable</td></tr>
<tr><td>15</td><td>If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example, simultaneous transmission configurations</td><td>Not Applicable</td></tr>
</table>

3. DESCRIPTION OF TEST EQUIPMENT

3.1 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 mMaximum 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.

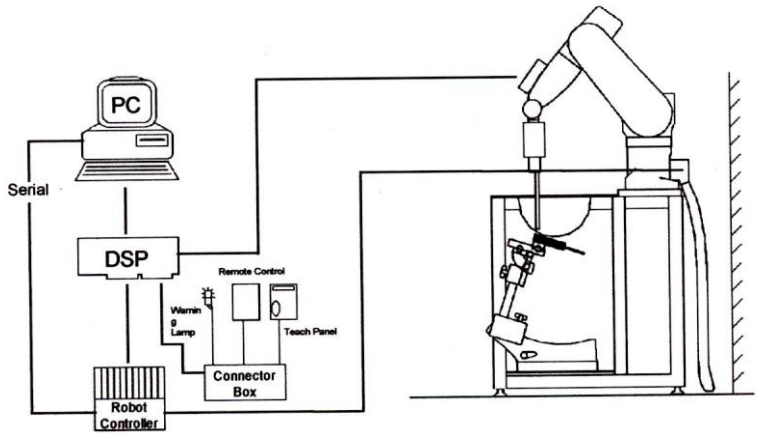


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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.

3.2 DASY4 E-FIELD PROBE SYSTEM

3.2.1 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 > 6 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 mobile phones Fast automatic scanning in arbitrary phantoms

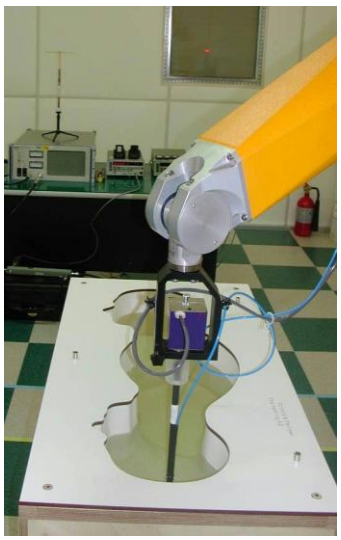


Figure 3.2 Photograph of the probe and the Phantom

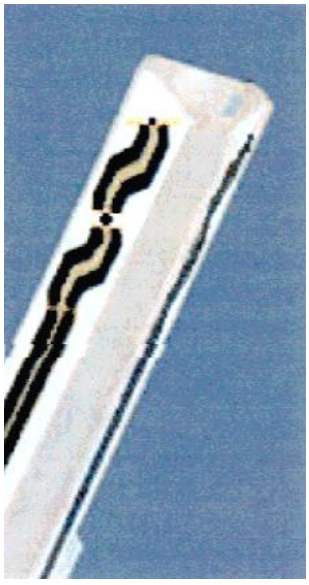


Figure 3.3 ET3DV6 E-field Probe

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.

3.3 PROBE CALIBRATION PROCESS

3.3.1 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)

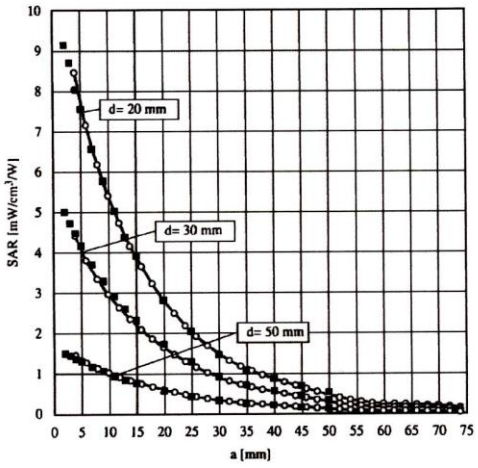


Figure 3.4 E-Field and Temperature measurements at 900 MHz

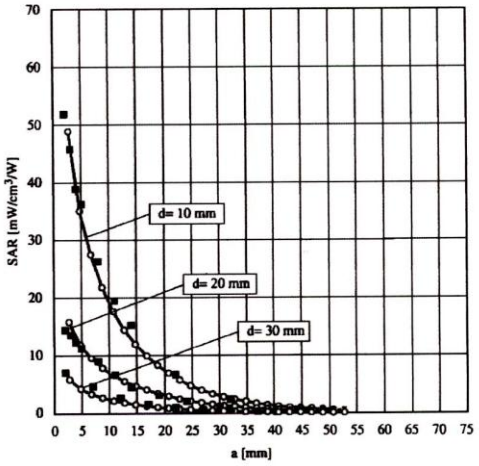


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

3.3.2 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

3.4 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 3.6 SAM Phantom

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

3.5 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 3.7 Device Holder

3.6 Brain & Muscle Simulating Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

Ingredients (% by weight)	Frequency (MHz)											
	450		750		835		915		1 900		2 450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.2	51.7	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.4	1.0	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	57	47.2	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	0.2	0.0	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.2	0.1	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7

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 3.1 Composition of the Tissue Equivalent Matter

3.7 SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	SAM 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. 27, 2012	Annual	Apr. 27, 2013
SPEAG	E-Field Probe ET3DV6	1609	Mar 19, 2012	Annual	Mar 19, 2013
SPEAG	Validation Dipole D1900V2	5d023	JUN.26 2012	Annual	JUN.26 2013
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 04, 2011	Annual	Nov. 04, 2012
Agilent	Power Sensor(G) 8481	MY41090870	Nov. 04, 2011	Annual	Nov. 04, 2012
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler	16072	Nov. 04, 2011	Annual	Nov. 04, 2012
R&S	Base Station CMU200	110740	July 23, 2012	Annual	July 23, 2013
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2012	Annual	Feb. 10, 2013
HP	Signal Generator E4438C	MY42082646	Nov. 11, 2011	Annual	Nov. 11, 2012
HP	Network Analyzer 8753ES	JP39240221	Apr. 3, 2012	Annual	Apr. 3, 2013
R&S	Base Station CMW500	101901	Aug.5,2011	Annual	Aug. 5,2012

NOTE:

The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Validation measurement is performed by HCT Lab. before each test. The brain 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-equivalent material.

4. 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 mMaximum 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 mMaximum interpolated value was searched with a straight-forward algorithm. Around this mMaximum 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.

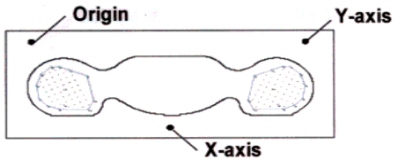


Figure 4.1 SAR Measurement Point in Area Scan

5. DESCRIPTION OF TEST POSITION

5.1 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.

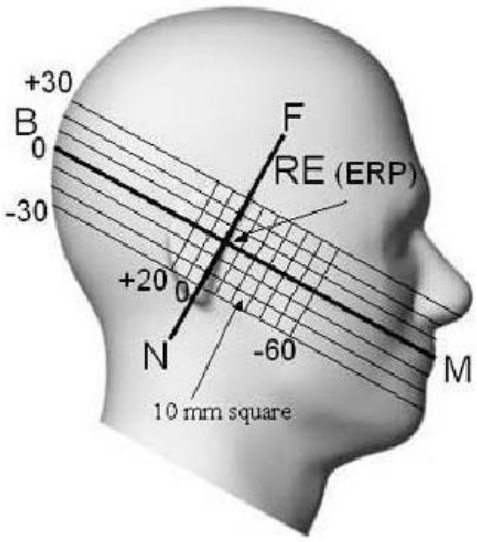


Figure 5.1 Side view of the phantom

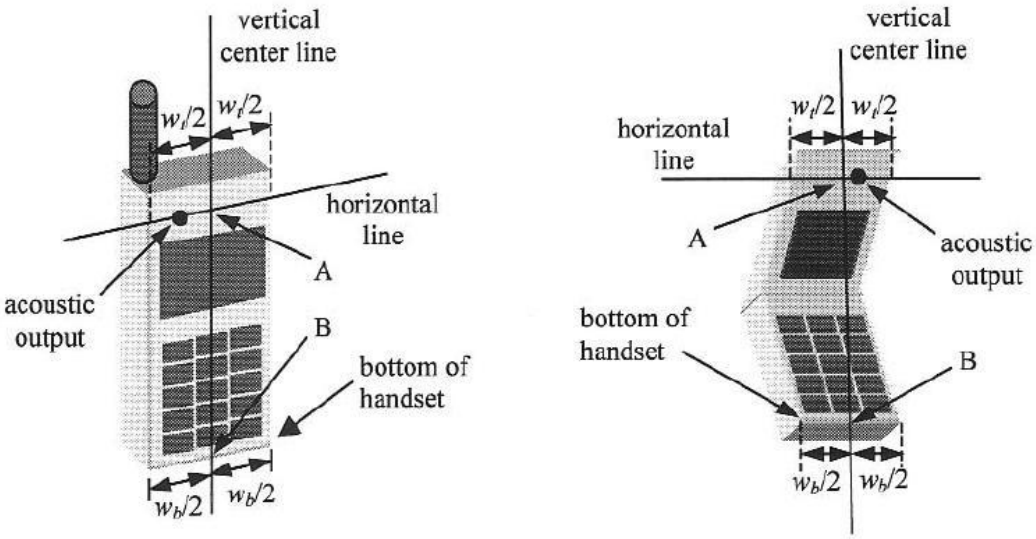


Figure 5.2 Handset vertical and horizontal reference lines

5.2 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 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. 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 6.1 Uncertainty (750 MHz- 2600 MHz)

7. 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 7.1 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).

8. SYSTEM VERIFICATION

8.1 Tissue Verification

Band	Freq. [MHz]	Date	Liquid	Liquid Temp.[°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
LTE B25	1900	Jul.7 , 2012	Head	21.1	ε ρ	40.0	39.8	- 0.50	± 5
					σ	1.40	1.41	+ 0.71	± 5
	1900	Jul.8 , 2012	Body	21.2	ε r	53.3	52.8	- 0.94	± 5
					σ	1.52	1.55	+ 1.97	± 5

The dielectronic parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070C

Dielectronic Probe Kit and Agilent Network Analyzer.

8.2 System Validation

Prior to assessment, the system is verified to the ± 10 % of the specifications at 1 900 MHz by using the system validation kit. (Graphic Plots Attached) ** Input Power: 100 m W*

Band	Freq. [MHz]	Probe (SN)	Dipole (SN)	Date	Liquid	Liquid Temp. [°C]	SAR Average	Target Value (SPEAG) (mW/g)	*Measured Value (mW/g)	Deviation [%]	Limit [%]
LTE B25	1 900	1609	5d023	Jul.7 , 2012	Head	21.1	1 g	39.0	3.94	+ 1.03	± 10
	1 900			Jul.8 , 2012	Body	21.2	1 g	38.8	4.15	+ 6.96	± 10

8.3 System Validation Procedure

SAR measurement was Prior to assessment, the system is verified to the ± 10 % of the specifications at target frequency by using the system validation kit. (Graphic Plots Attached)

- Cabling the system, using the validation 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.

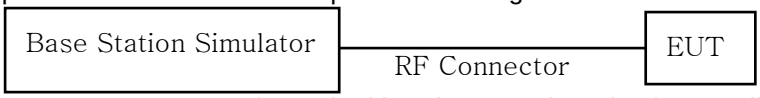
Note;

SAR Verification was performed according to the FCC KDB 450824.

9. 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.

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



SAR Test for WWAN & LTE were performed with a base station simulator Agilent E5515C & CMW500. 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.

9.1 LTE

SAR testing was performed according to the FCC KDB 941225 D05 publication.
The device has been developed base on MPR. The MPR is mandatory.
The device will not operate with any other MPR setting than that stated in the table as indicated.
SAR Testing was performed using a CMW500. UE transmits with Maximum output power during SAR testing.
A-MPR has been disabled for all SAR tests by setting NS=01 on the R&S CMW500.

9.1.1 LTE25 10MHz

Target Power : 23.0 dBM
Tune up Tolerance : + 0.7dB

Bandwidth	UL Channel	UL Freq.(MHz)	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	Target MPR (dB)
10 MHz	26065	1852.5	QPSK	1	0	23.40	0
				1	49	23.59	0
				25	12	22.53	1
				50	0	22.48	1
			16QAM	1	0	22.54	1
				1	49	22.80	1
				25	12	21.67	2
				50	0	21.67	2
10 MHz	26365	1882.5	QPSK	1	0	23.56	0
				1	49	23.56	0
				25	12	22.60	1
				50	0	22.51	1
			16QAM	1	0	22.70	1
				1	49	22.79	1
				25	12	21.71	2
				50	0	21.80	2
10 MHz	26665	1912.5	QPSK	1	0	23.47	0
				1	49	23.25	0
				25	12	22.38	1
				50	0	22.35	1
			16QAM	1	0	22.64	1
				1	49	22.24	1
				25	12	21.53	2
				50	0	21.60	2

LTE Conducted output powers

Note;
The EUT enables maximum power reduction in accordance with 3GPP 36.101. The LTE MPR targets are document in the tune up procedure. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

9.4. SVLTE/SVDO RF Conducted Power

The EUT uses a power reduction technique where the data mode transmit power is reduced a predetermined amount based on the voice transmit power. As voice 1x power approaches maximum transmit power, the data mode transmit power is reduced a configured magnitude. For low voice 1x power levels, there is no restriction on the data mode transmit power. Although this device supports SVDO/SVLTE power reduction, initial SAR evaluation will use the max. output power without power reduction. If the SVDO and SVLTE mode of operation can achieve SAR compliance without power reduction, SVDO and SVLTE with reduced power will not be performed. However, if during SAR evaluation, it is determined that power reduction is required to achieve SAR compliance; test report will include the output power used during final SAR evaluation.

Mode	CDMA Current Voice Power for BC0, BC1 & BC10 Average Power 1x(dBm)	Maximum EVDO Average Power for BC0 & BC1 (dBm)
SVDO	P<15.5	23.8 (Limited)
	P≥15.5	18.8 (Limited)
Mode	**Voice Average Power 1x for BC0, BC1 & BC10 (dBm)**	**Maximum LTE Average Power for B25 (dBm)**
SVLTE	P<18.5	23.0 (Limited)
	P≥18.5	19.0 (Limited)

Power reduction Settings

9.4.1 SVLTE

SV-LTE: CDMA 1xRTT(BC0) to SV-LTE Band 25(QPSK,16QAM)

CDAM BC0 850 1xRTT		QPSK				16QAM			
		Output Power[dBm]				Output Power[dBm]			
ch #	Output Power [dBm]	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,
low-1013	11	23.77	23.90	22.70	22.81	22.80	23.04	21.58	22.18
	18	23.77	23.90	22.70	22.81	22.80	23.04	21.58	22.18
	19	19.30	19.40	18.89	19.31	19.00	19.30	19.21	19.42
	24	19.30	19.40	18.89	19.31	19.00	19.30	19.21	19.42
Middle_384	11	23.78	23.90	22.70	22.80	22.79	23.03	21.59	22.19
	18	23.78	23.90	22.70	22.80	22.79	23.03	21.59	22.19
	19	19.20	19.30	19.01	19.20	19.10	19.20	19.20	19.50
	24	19.20	19.30	19.01	19.20	19.10	19.20	19.20	19.50
High_777	11	23.79	23.89	22.69	22.80	22.79	23.02	21.58	22.19
	18	23.79	23.89	22.69	22.80	22.79	23.02	21.58	22.19
	19	19.10	19.20	19.10	19.20	19.20	19.31	19.11	19.42
	24	19.10	19.20	19.10	19.20	19.20	19.31	19.11	19.42

SV-LTE: CDMA 1xRTT(BC1) to SV-LTE Band 25(QPSK,16QAM)

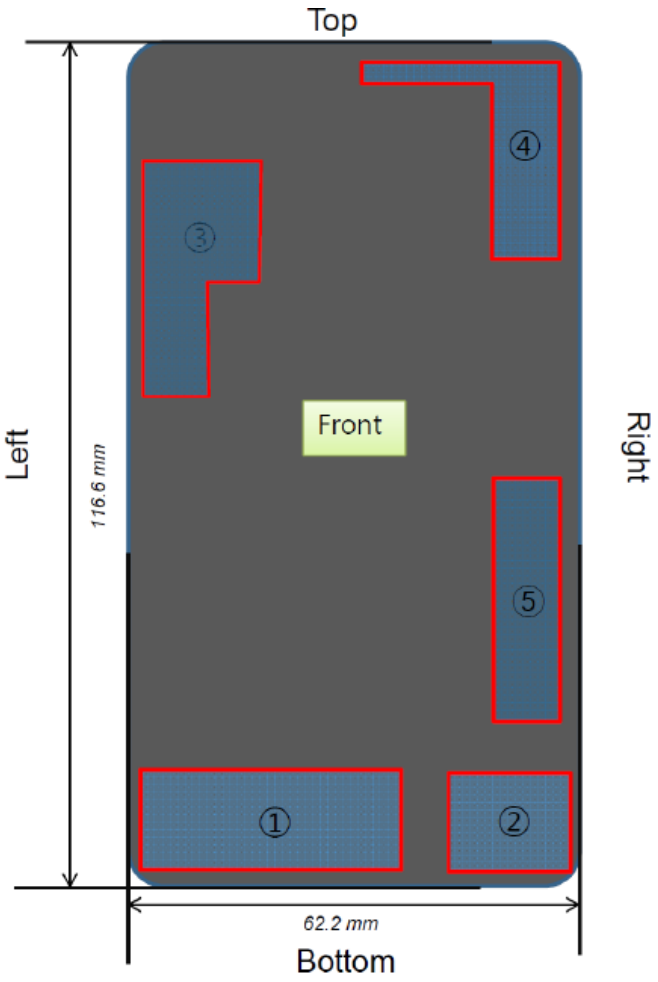
CDAM BC1 1900 1xRTT		QPSK				16QAM			
		Output Power[dBm]				Output Power[dBm]			
ch #	Output Power [dBm]	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,
low-25	11	23.79	23.89	22.71	22.81	22.80	23.02	21.58	22.18
	18	23.79	23.89	22.71	22.81	22.80	23.02	21.58	22.18
	19	19.30	19.45	19.01	19.10	19.40	19.51	19.24	19.42
	24	19.30	19.45	19.01	19.10	19.40	19.51	19.24	19.42
Middle_600	11	23.78	23.89	22.71	22.82	22.99	23.03	21.58	21.17
	18	23.78	23.89	22.71	22.82	22.99	23.03	21.58	21.17
	19	19.28	19.48	18.99	19.11	19.40	19.54	19.23	19.38
	24	19.28	19.48	18.99	19.11	19.40	19.54	19.23	19.38
High_1175	11	23.78	23.91	22.71	22.81	23.00	23.03	21.58	22.19
	18	23.78	23.91	22.71	22.81	23.00	23.03	21.58	22.19
	19	19.31	19.51	19.01	19.12	19.41	19.53	19.23	19.41
	24	19.31	19.51	19.01	19.12	19.41	19.53	19.23	19.41

SV-LTE: CDMA 1xRTT(BC10) to SV-LTE Band 25(QPSK,16QAM)

CDAM BC10 1900 1xRTT		QPSK				16QAM			
		Output Power[dBm]				Output Power[dBm]			
ch #	Output Power [dBm]	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,	1RB, 0 offset	1RB,24 offset	12RB,6 offset	25RB,
Middle_580	11	23.77	23.90	22.73	22.73	22.99	23.03	21.58	22.17
	18	23.77	23.90	22.73	22.73	22.99	23.03	21.58	22.17
	19	19.37	19.41	19.22	19.20	19.10	19.32	19.20	19.28
	24	19.37	19.41	19.22	19.20	19.10	19.32	19.20	19.28

10. Antenna Information &SAR Testing Confogurations

10.1 Antenna and Device Information



① CDMA 1x BC0, BC1, BC10 Rx/Tx

MODE	BAND	TX(MHz)	RX(MHz)
CDMA	BC0	824 ~ 849	869 ~ 894
	BC1	1850 ~ 1910	1930 ~ 1990
	BC10	816 ~ 824	861 ~ 869

② LTE Band 25 2nd RX, EVDO BC1 Rx Diversity

MODE	BAND	TX(MHz)	RX(MHz)
LTE	B25	2nd Rx	1930 ~ 1995
EVDO	BC1	Diversity	1930 ~ 1990

③ LTE Band 25 Rx/Tx , EVDO BC1 Rx/Tx

MODE	BAND	TX(MHz)	RX(MHz)
LTE	B25	1850 ~ 1915	1930 ~ 1995
EVDO	BC1	1850 ~ 1910	1930 ~ 1990

④ EVDO BC0 Rx/Tx , GPS

MODE	TX(MHz)	RX(MHz)
GPS	x	1575.42
EVDO BC0	824 ~ 849	869~894

⑤ BT/Wifi

MODE	TX(MHz)	RX(MHz)
BT & WiFi (802.11b/g/n)	BT : 2402 (1ch) ~ 2480 (79ch) Wifi : 2412(1ch) ~ 2462(11ch)	BT : 2402 (1ch) ~ 2480 (79ch) Wifi : 2412(1ch) ~ 2462(11ch)

10.2 Antenna Separation Distance

Antennas	Physical Separation Distance (mm)				
	ANT ①	ANT ②	ANT ③	ANT ④	ANT ⑤
ANT ①		4.7	61.1	68.1	20.0
ANT ②	4.7		73.5	68.5	13.2
ANT ③	61.1	73.5		21.0	55.5
ANT ④	68.1	68.5	21.0		27.8
ANT ⑤	20.0	13.2	55.5	27.8	

Note;

Per KDB 941225 D06 hotspot procedures, we performed the SAR testing at 1 cm from the top & bottom surfaces and also from side edges with a transmitting antenna ≤ 2.5 cm from an edge.

10.3 SAR Test configurations

Head Operation						
Mode	Band	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
CDMA Voice(1xRTT)	BC0	Yes	No	No	No	No
CDMA Voice(1xRTT)	BC1	Yes	No	No	No	No
CDMA Voice(1xRTT)	BC10	Yes	No	No	No	No
EVDO(VOIP)	BC0	No	No	No	Yes	No
EVDO(VOIP)	BC1	No	No	Yes	No	No
EVDO(VOIP)	BC10	No	No	No	No	No
LTE Data	25	No	No	Yes	No	No
SVDO(Voice & Data)	BC0	Yes	No	No	Yes	No
SVDO(Voice & Data)	BC1	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC0/ LTE25	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC1/ LTE25	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC10/ LTE25	Yes	No	Yes	No	No
Wi-Fi(VOIP)	2400	No	No	No	No	Yes
BT	2400	No	No	No	No	Yes
Body-worn Operation						
Mode	Band	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
CDMA Voice(1xRTT)	BC0	Yes	No	No	No	No
CDMA Voice(1xRTT)	BC1	Yes	No	No	No	No
CDMA Voice(1xRTT)	BC10	Yes	No	No	No	No
EVDO (VOIP)	BC0	No	No	No	Yes	No
EVDO (VOIP)	BC1	No	No	Yes	No	No
EVDO (VOIP)	BC10	No	No	No	No	No
LTE Data	25	No	No	Yes	No	No
SVDO(Voice & Data)	BC0	Yes	No	No	Yes	No
SVDO(Voice & Data)	BC1	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC0/ LTE25	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC1/ LTE25	Yes	No	Yes	No	No
SVLTE(Voice & Data)	BC10/ LTE25	Yes	No	Yes	No	No
Wi-Fi(VOIP)	2400	No	No	No	No	Yes
BT	2400	No	No	No	No	Yes
Wireless Router/ Hotspot Operation						
Separation Distance = 1 cm						
Mode	Band	ANT ①	ANT ②	ANT ③	ANT ④	ANT⑤
EVDO Data+Wi-Fi	BC0	No	No	No	Yes	Yes
EVDO Data+Wi-Fi	BC1	No	No	Yes	No	Yes
LTE Data+Wi-Fi	LTE25	No	No	Yes	No	Yes
SVDO(Voice & Data)+Wi-Fi	BC0/BC0	Yes	No	No	No	Yes
SVDO(Voice & Data)+Wi-Fi	BC0/BC1	Yes	No	Yes	Yes	Yes
SVDO(Voice & Data)+Wi-Fi	BC1/BC0	Yes	No	No	No	Yes
SVDO(Voice & Data)+Wi-Fi	BC/BC1	Yes	No	Yes	No	Yes
SVLTE(Voice & Data)+Wi-F	BC0 & B25	Yes	No	Yes	No	Yes
SVLTE(Voice & Data)+Wi-F	BC10 & B25	Yes	No	Yes	No	Yes
SVLTE(Voice & Data)+Wi-F	BC1 & B25	Yes	No	Yes	No	Yes

11. SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas

11.1 SAR Evaluation Considerations

These procedures were followed according to FCC "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas", May 2008. The procedures are applicable to phones with built-in unlicensed transmitters, such as 802.11 a/b/g and Bluetooth devices.

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this				

Table. 11.1 Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	Routine evaluation required	SAR not required: Unlicensed only ○ when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed ○ when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas ○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – ○ output ≤ 60/f: SAR not required ○ output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when ○ output ≤ 2·P_{Ref} and antenna is ≥ 5.0 cm from other antennas ○ output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas ○ output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required ○ test SAR on highest output channel for each wireless mode and exposure condition ○ if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	
Jaw, Mouth and Nose	Flat phantom SAR required ○ when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues ○ position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Table. 11.2 SAR Evaluation Requirements for Cellphones with Multiple Transmitters

FCC ID: ZNFLS840

11.2 Simultaneous Transmission Conditions

Summary of Simultaneous

No.	Capable TX Configuration	Head SAR	Body SAR	Hotspot SAR	Power Reduction (CDMA EVDO)	Power Reduction (LTE)	Note
1	CDMA Voice	O	O	x	x	x	Stand-alone CDMA Voice
2	CDMA EVDO	O	O	x	x	x	Stand-alone CDMA EVDO
3	LTE	O	O	x	x	O	Stand-alone LTE
4	Wi-Fi	O	O	x	x	x	Stand-alone Wi-Fi
5	BT	x	x	x	x	x	
6	CDMA Voice + CDMA EVDO	O	O	x	O	x	SVDO
7	CDMA Voice + LTE	O	O	x	x	O	SVLTE
8	CDMA Voice + CDMA EVDO + WLAN	O	O	O	O	x	WI-FI Hotspot
9	CDMA Voice + LTE + WLAN	O	O	O	x	O	WI-FI Hotspot

* BT and WLAN are not simultaneous transmission.

* CDMA EVDO and LTE are not simultaneous transmission.

* VOIP support (LTE, EVDO).

* SVLTE, SVDO is supported

* Power reduction is implemented on EVDO in SVDO mode

* Power reduction is implemented on LTE in SVLTE mode.

All Simultaneous case

No.	Capable TX Configuration	Head SAR	Body SAR	Hotspot SAR	Power Reduction (CDMA EVDO)	Power Reduction (LTE)	Note
1	CDMA BC0 Voice	O	O	x	x	x	Stand-alone CDMA BC0 Voice
2	CDMA BC1 Voice	O	O	x	x	x	Standalone CDMA BC1 Voice
3	CDMA BC10 Voice	O	O	x	x	x	Stand-alone CDMA EVDO BC0
4	CDMA BC0 EVDO	O	O	x	x	x	Stand-alone CDMA EVDO BC1
5	CDMA BC1 EVDO	O	O	x	x	x	
6	LTE B25	O	O	x	x	x	Stand-alone LTE B13 data
7	Wi-Fi	O	O	x	x	x	Stand-alone Wi-Fi
8	BT	x	x	x	x	x	N/A
9	CDMA BC0 Voice + Wi-Fi data	O	O	x	x	x	
10	CDMA BC1 Voice + Wi-Fi data	O	O	x	x	x	
11	CDMA BC10 Voice + Wi-Fi data	O	O	x	x	x	
12	CDMA BC0 EVDO+ Wi-Fi data	x	O	O	x	x	WI-FI Hotspot
13	CDMA BC1 EVDO+ Wi-Fi data	x	O	O	x	x	WI-FI Hotspot
14	LTE B25 + Wi-Fi data	x	O	O	x	x	WI-FI Hotspot
15	CDMA BC0 Voice + CDMA BC0 EVDO	O	O	x	O	x	SVDO
16	CDMA BC0 Voice + CDMA BC1 EVDO	O	O	x	O	x	SVDO
17	CDMA BC0 Voice + LTE B25	O	O	x	x	O	SVLTE
18	CDMA BC1 Voice + CDMA BC0 EVDO	O	O	x	O	x	SVDO
19	CDMA BC1 Voice + CDMA BC1 EVDO	O	O	x	O	x	SVDO
20	CDMA BC1 Voice + LTE B25	O	O	x	x		SVLTE
21	CDMA BC10 Voice + CDMA BC0 EVDO	O	O	x			WI-FI Hotspot + SVDO
22	CDMA BC10 Voice + CDMA BC1 EVDO	O	O	x			
23	CDMA BC0 Voice + CDMA BC0 EVDO + WLAN	O	O				WI-FI Hotspot + SVDO
24	CDMA BC0 Voice + CDMA BC1 EVDO + WLAN	O	O				
25	CDMA BC0 Voice + LTE B25 + WLAN	O	O	O		O	WI-FI Hotspot + SVLTE
26	CDMA BC1 Voice + CDMA BC0 EVDO+ WLAN	O	O	O	O		WI-FI Hotspot + SVDO
27	CDMA BC1 Voice + CDMA BC1 EVDO+ WLAN	O	O	O	O		WI-FI Hotspot + SVDO
28	CDMA BC1 Voice + LTE B25 + WLAN	O	O	O		O	
29	CDMA BC10 Voice + CDMA BC1 EVDO+ WLAN	O	O	O	O		
30	CDMA BC10 Voice + CDMA BC1 EVDO+ WLAN	O	O	O	O		
31	CDMA BC10 Voice + LTE B25+ WLAN	O	O	O		O	WI-FI Hotspot + SVLTE

* BT and WLAN are not simultaneous transmission.

* CDMA EVDO and LTE are not simultaneous transmission.

* VOIP support (LTE, EVDO).

*Hotspot support (LTE, EVDO).

* SVLTE, SVDO is supported.

11.3 SAR Summation Scenario

11.3.1 SV-LTE Head Exposure Condition

Position	Voice			Data		∑ 1g SAR
	CDMA850 1xRTT	CDMA BC10 1xRTT	CDMA1900 1xRTT	LTE Band 13	WiFi	
Left Touch	0.442			0.441	0.042	0.972
Left Tilt	0.227			0.405	0.024	0.754
Right Touch	0.494			0.669	0.116	1.372
Right Tilt	0.222			0.506	0.019	0.771
Left Touch			1.13	0.441	0.042	1.66
Left Tilt			0.36	0.405	0.024	0.887
Right Touch			0.921	0.669	0.116	1.799
Right Tilt			0.358	0.506	0.019	0.907
Left Touch		0.450		0.441	0.042	0.98
Left Tilt		0.242		0.405	0.024	0.769
Right Touch		0.470		0.669	0.116	1.348
Right Tilt		0.234		0.506	0.019	0.783

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	worst-case combination			Σ1g SAR	3D distance (cm)	SPLSR
	PCS1900 1xRTT	LTE Band 25	WiFi			
Left touch	1.13	0.441	0.042	1.66		
	1.13	0.441		1.571	n/a	n/a
	1.13		0.042	1.172	n/a	n/a
		0.441	0.042	0.483	n/a	n/a

Test Position	worst-case combination			Σ1g SAR	3D distance (cm)	SPLSR
	PCS1900 1xRTT	LTE	WiFi			
Right touch	0.921	0.669	0.116	1.799		
	0.921	0.669		1.59	n/a	n/a
	0.921		0.116	1.037	n/a	n/a
		0.669	0.116	0.878	n/a	n/a

Conclusions:

Simultaneous transmission SAR measurement (volume scan) is not required due to the sum of the 1-g SAR for antenna pairs being <1.6 W/kg. and SPLSR < 0.3

11.3.2 SV-LTE Body-worn and Body-hotspot Exposure Condition

Position	Voice			Data		∑ 1g SAR
	CDMA850 1xRTT	CDMA BC10 1xRTT	CDMA1900 1xRTT	LTE Band 25	WiFi	
Rear	0.922			0.571	0.239	1.732
Front	0.728			0.299	0.045	1.027
Rear			0.915	0.571	0.239	1.725
Front			0.966	0.299	0.045	1.31
Rear		1.05		0.571	0.239	1.86
Front		0.696		0.299	0.045	1.04

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	worst-case combination			Σ1g SAR	3D distance (cm)	SPLSR
	CDMA850 1xRTT	LTE Band 25	WiFi			
Rear	0.922	0.571	0.239	1.732		
	0.922	0.571		1.493	n/a	n/a
	0.922		0.239	1.161	n/a	n/a
		0.571	0.239	1.069	n/a	n/a

Test Position	worst-case combination			Σ1g SAR	3D distance (cm)	SPLSR
	CDMA BC10 1xRTT	LTE Band 25	WiFi			
Rear	1.05	0.571	0.239	1.86		
	1.05	0.571		1.621	7.6	0.21
	1.05		0.239	1.289	n/a	n/a
		0.571	0.239	1.069	n/a	n/a

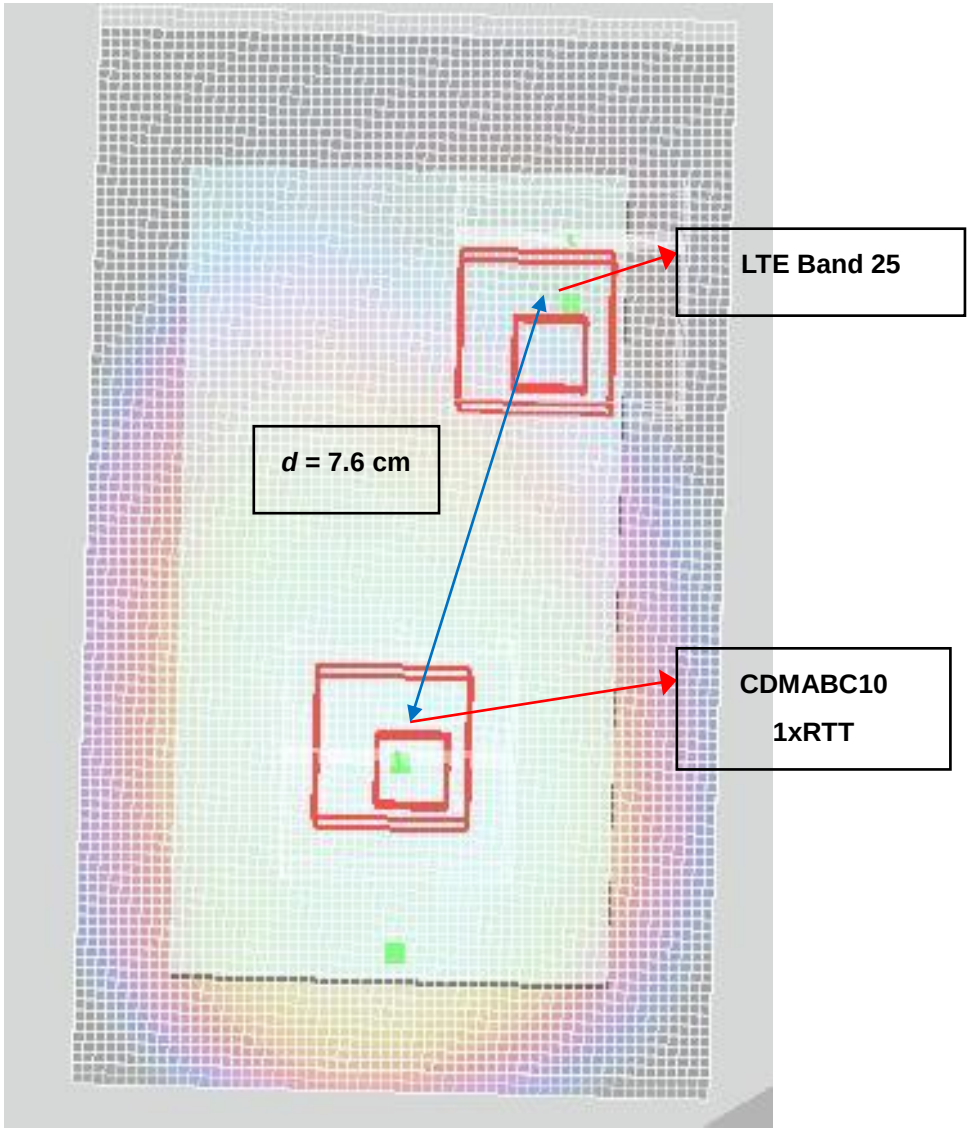
Test Position	worst-case combination			Σ1g SAR	3D distance (cm)	SPLSR
	PCS1900 1xRTT	LTE Band 25	WiFi			
Rear	0.915	0.571	0.239	1.725		
	0.915	0.571		1.486	n/a	n/a
	0.915		0.239	1.154	n/a	n/a
		0.571	0.239	1.069	n/a	n/a

Conclusions:

Simultaneous transmission SAR measurement (volume scan) is not required due to the sum of the 1-g SAR for antenna pairs being <1.6 W/kg. and SPLSR < 0.3

SAR to Peak Location Separation Ratio (SPLSR)

"CDMA BC10 1xRTT" to "LTE Band 25"



	Value of SAR	X	Y	Z
	mW/g	m	m	m
CDMA BC10 1xRTT	1.05	-0.009	-0.0635	-0.203
LTE Band 25	0.571	0.00654	0.0105	-0.205

Separation Distance $d = \sqrt[2]{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$

= 7.6 cm

12. SAR TEST DATA SUMMARY

12.1 Measurement Results (LTE Band25 10MHz QPSK Head)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	RB Size	RB Offset	Phantom Position	SAR(mW/g)	MPR
MHz	Channel								
1882.5	26365	QPSK	22.51	-0.078	25	12	Left Ear	0.418	1
1882.5	26365	QPSK	23.56	-0.063	1	0	Left Ear	0.430	0
1882.5	26365	QPSK	23.56	-0.008	1	49	Left Ear	0.441	0
1882.5	26365	QPSK	22.51	0.020	25	12	Left Tilt 15°	0.372	1
1882.5	26365	QPSK	23.56	-0.063	1	0	Left Tilt 15°	0.382	0
1882.5	26365	QPSK	23.56	-0.002	1	49	Left Tilt 15°	0.405	0
1882.5	26365	QPSK	22.51	-0.032	25	12	Right Ear	0.502	1
1882.5	26365	QPSK	23.56	-0.025	1	0	Right Ear	0.612	0
1882.5	26365	QPSK	23.56	-0.032	1	49	Right Ear	0.669	0
1882.5	26365	QPSK	22.51	-0.025	25	12	Right Tilt 15°	0.368	1
1882.5	26365	QPSK	23.56	0.012	1	0	Right Tilt 15°	0.444	0
1882.5	26365	QPSK	23.56	0.02	1	49	Right Tilt 15°	0.506	0
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							**Head 1.6 W/kg (mW/g) Averaged over 1 gram**		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
6 Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
7 KDB 941225 D05 SAR for LTE Devices v01 was followed.
- QPSK with 50% RB is required for the largest channel Bandwidth.
- QPSK with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 16QAM with 50% RB is required for the largest channel Bandwidth.
- 16QAM with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 100% RB allocation is not required since SAR is not > 1.45 W/kg.
- The Low & High channel were not required for Band 5/4 since the power variation across all channels is 1/2 dB and SAR is ≤ 0.8 W/kg.

12.2 Measurement Results (LTE Band25 10MHz 16QAM Head)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	RB Size	RB Offset	Phantom Position	SAR(mW/g)	MPR
MHz	Channe								
1882.5	26365	16QAM	21.80	-0.036	25	12	Left Ear	0.369	2
1882.5	26365	16QAM	22.70	0.066	1	0	Left Ear	0.406	1
1882.5	26365	16QAM	22.79	-0.059	1	49	Left Ear	0.367	1
1882.5	26365	16QAM	21.80	0.007	25	12	Left Tilt 15°	0.322	2
1882.5	26365	16QAM	22.70	-0.036	1	0	Left Tilt 15°	0.366	1
1882.5	26365	16QAM	22.79	-0.046	1	49	Left Tilt 15°	0.318	1
1882.5	26365	16QAM	21.80	-0.069	25	12	Right Ear	0.421	2
1882.5	26365	16QAM	22.70	0.056	1	0	Right Ear	0.483	1
1882.5	26365	16QAM	22.79	0.01	1	49	Right Ear	0.581	1
1882.5	26365	16QAM	21.80	-0.071	25	12	Right Tilt 15°	0.302	2
1882.5	26365	16QAM	22.70	0.028	1	0	Right Tilt 15°	0.338	1
1882.5	26365	16QAM	22.79	0.163	1	49	Right Tilt 15°	0.373	1

ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population	Head 1.6 W/kg (mW/g) Averaged over 1 gram

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.
6 Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
7 KDB 941225 D05 SAR for LTE Devices v01 was followed.
- QPSK with 50% RB is required for the largest channel Bandwidth.
- QPSK with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 16QAM with 50% RB is required for the largest channel Bandwidth.
- 16QAM with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 100% RB allocation is not required since SAR is not > 1.45 W/kg.
- The Low & High channel were not required for Band 5/4 since the power variation across all channels is 1/2 dB and SAR is ≤ 0.8 W/kg.

12.3 Measurement Results (Band25 10MHz QPSK Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	SAR(mW/g)	MPR
MHz	Channel									
1882.5	26365	QPSK	22.51	-0.023	Rear	25	12	1.0 cm	0.439	1
1882.5	26365	QPSK	23.56	0.021	Rear	1	0	1.0 cm	0.529	0
1882.5	26365	QPSK	23.56	-0.033	Rear	1	49	1.0 cm	0.571	0
1882.5	26365	QPSK	22.51	-0.035	Front	25	12	1.0 cm	0.216	1
1882.5	26365	QPSK	23.56	0.022	Front	1	0	1.0 cm	0.266	0
1882.5	26365	QPSK	23.56	-0.032	Front	1	49	1.0 cm	0.299	0
1882.5	26365	QPSK	22.51	-0.09	Left	25	12	1.0 cm	0.235	1
1882.5	26365	QPSK	23.56	-0.023	Left	1	0	1.0 cm	0.281	0
1882.5	26365	QPSK	23.56	0.018	Left	1	49	1.0 cm	0.323	0
1882.5	26365	QPSK	22.51	0.135	Top	25	12	1.0 cm	0.099	1
1882.5	26365	QPSK	23.56	0.033	Top	1	0	1.0 cm	0.127	0
1882.5	26365	QPSK	23.56	0.029	Top	1	49	1.0 cm	0.137	0
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								**Body 1.6 W/kg (mW/g) Averaged over 1 gram**		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2 All modes of operation were investigated and the worst-case are reported.

3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4 Tissue parameters and temperatures are listed on the SAR plot.

5 Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.

6 Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator

7 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

8 KDB 941225 D05 SAR for LTE Devices v01 was followed.
- QPSK with 50% RB is required for the largest channel Bandwidth.
- QPSK with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 16QAM with 50% RB is required for the largest channel Bandwidth.
- 16QAM with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 100% RB allocation is not required since SAR is not > 1.45 W/kg.
- The Low & High channel were not required for Band 5/4 since the power variation across all channels is 1/2 dB and SAR is ≤ 0.8 W/kg.

12.4 Measurement Results (Band25 5 MHz 16QAM Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	SAR(mW/g)	MPR
MHz	Channel									
1882.5	26365	16QAM	21.80	0.009	Rear	25	12	1.0 cm	0.385	2
1882.5	26365	16QAM	22.70	-0.017	Rear	1	0	1.0 cm	0.412	1
1882.5	26365	16QAM	22.79	0.167	Rear	1	49	1.0 cm	0.447	1
1882.5	26365	16QAM	21.80	0.129	Front	25	12	1.0 cm	0.200	2
1882.5	26365	16QAM	22.70	0.047	Front	1	0	1.0 cm	0.211	1
1882.5	26365	16QAM	22.79	0.057	Front	1	49	1.0 cm	0.239	1
1882.5	26365	16QAM	21.80	0.027	Left	25	12	1.0 cm	0.210	2
1882.5	26365	16QAM	22.70	0.059	Left	1	0	1.0 cm	0.247	1
1882.5	26365	16QAM	22.79	0.039	Left	1	49	1.0 cm	0.282	1
1882.5	26365	16QAM	21.80	0.054	Top	25	12	1.0 cm	0.093	2
1882.5	26365	16QAM	22.70	0.127	Top	1	0	1.0 cm	0.108	1
1882.5	26365	16QAM	22.79	0.081	Top	1	49	1.0 cm	0.116	1

\ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population	Body 1.6 W/kg (mW/g) Averaged over 1 gram

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2 All modes of operation were investigated and the worst-case are reported.

3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4 Tissue parameters and temperatures are listed on the SAR plot.

5 Battery Type ☒ Standard ☐ Extended ☐ Slim
Batteries are fully charged for all readings.

6 Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator

7 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

8 KDB 941225 D05 SAR for LTE Devices v01 was followed.
- QPSK with 50% RB is required for the largest channel Bandwidth.
- QPSK with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 16QAM with 50% RB is required for the largest channel Bandwidth.
- 16QAM with 1 RB for both channel edges are required for the largest channel Bandwidth.
- 100% RB allocation is not required since SAR is not > 1.45 W/kg.
- The Low & High channel were not required for Band 5/4 since the power variation across all channels is 1/2 dB and SAR is ≤ 0.8 W/kg.

13. 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 BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 10MHz 25RB 12 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.452 mW/g

Left touch 10MHz 25RB 12 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

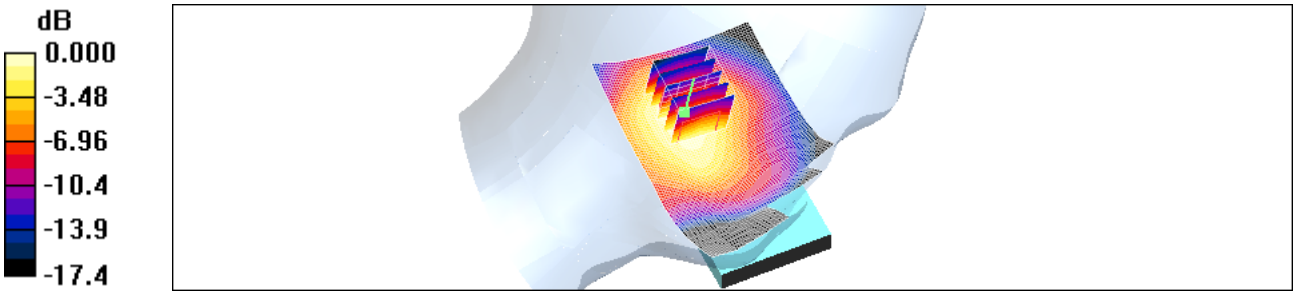
Reference Value = 12.3 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.597 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.257 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.457 mW/g



0 dB = 0.457mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left touch 10MHz 1RB 0 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.474 mW/g

Left touch 10MHz 1RB 0 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

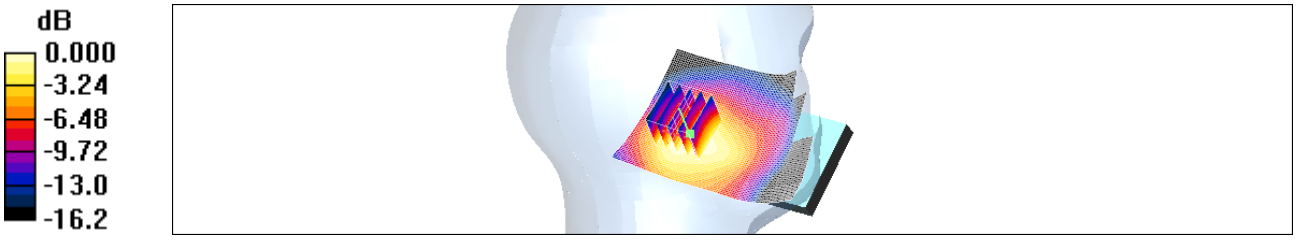
Reference Value = 12.7 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.622 W/kg

SAR(1 g) = 0.430 mW/g; SAR(10 g) = 0.266 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.468 mW/g



0 dB = 0.468mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Left touch 10MHz 1RB 49offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.479 mW/g

Left touch 10MHz 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

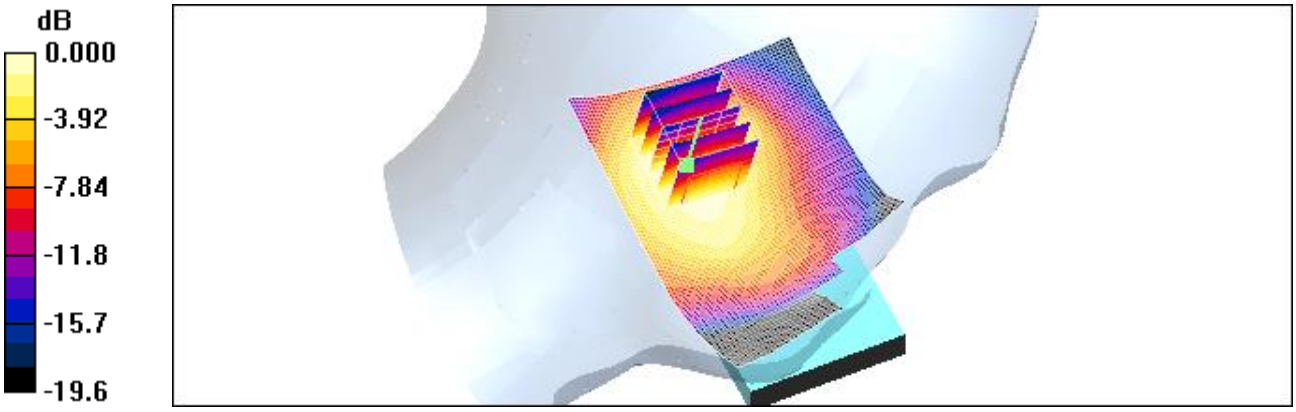
Reference Value = 12.8 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 0.660 W/kg

SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.264 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.482 mW/g



0 dB = 0.482mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Left tilt 10MHz 25RB 12offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.393 mW/g

Left tilt 10MHz 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

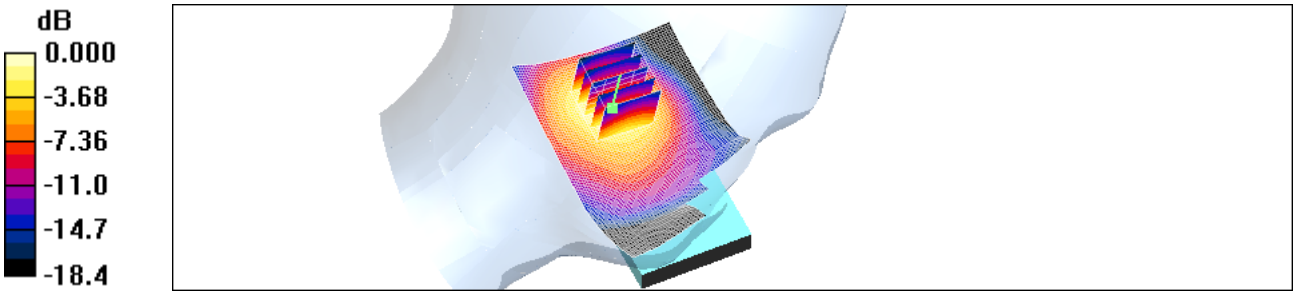
Reference Value = 12.4 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.597 W/kg

SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.210 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.415 mW/g



0 dB = 0.415mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left tilt 10MHz 25RB 12offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.452 mW/g

Left tilt 10MHz 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

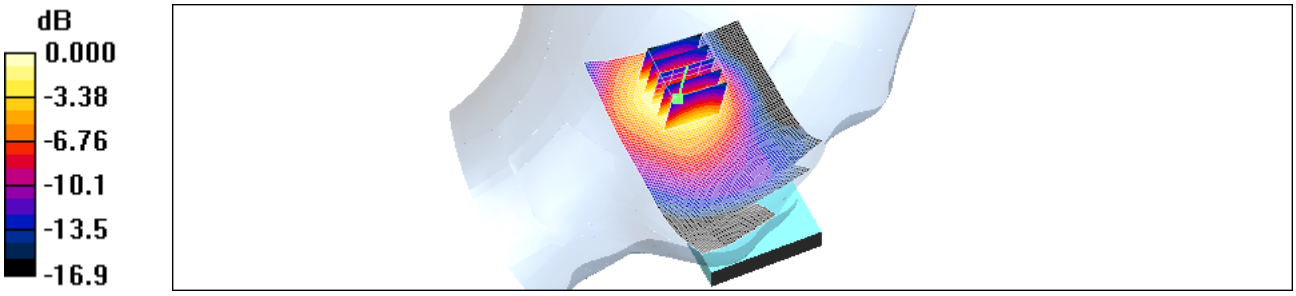
Reference Value = 14.5 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.563 W/kg

SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.223 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.428 mW/g



0 dB = 0.428mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left tilt 10MHz 1RB 49offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.469 mW/g

Left tilt 10MHz 1RB 49offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

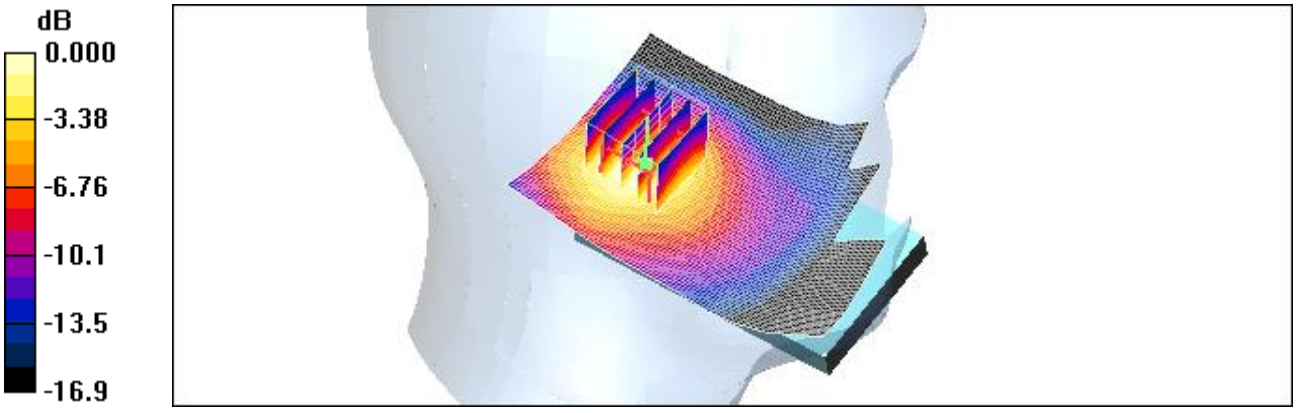
Reference Value = 15.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.606 W/kg

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.235 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.460 mW/g



0 dB = 0.460mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 25 RB 12 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.602 mW/g

Right Touch 10Mhz 25 RB 12 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

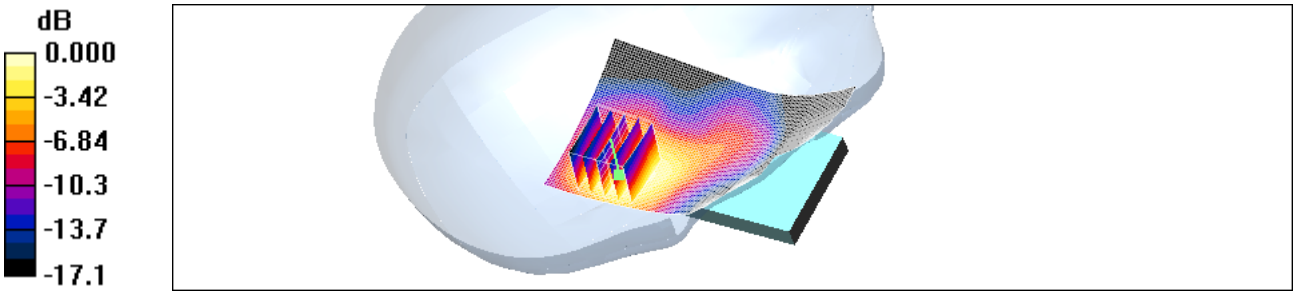
Reference Value = 8.61 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.823 W/kg

SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.299 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.543 mW/g



0 dB = 0.543mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 1 RB 0 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.733 mW/g

Right Touch 10Mhz 1 RB 0 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

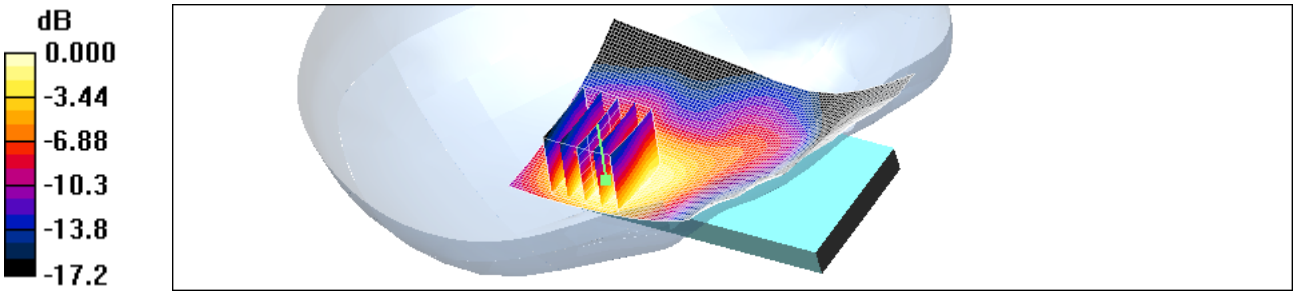
Reference Value = 9.88 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.363 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.659 mW/g



0 dB = 0.659mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 1 RB 49 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.814 mW/g

Right Touch 10Mhz 1 RB 49 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

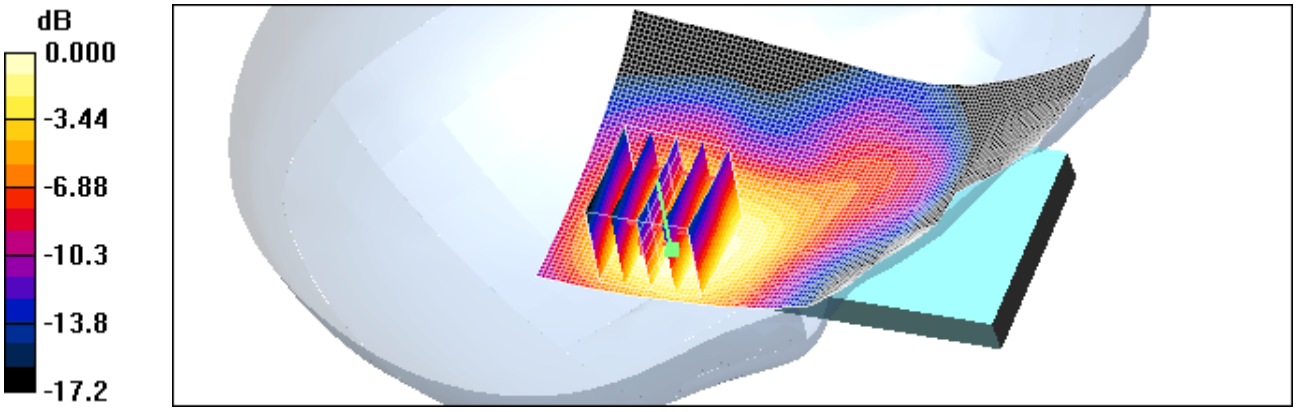
Reference Value = 10.3 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.400 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.720 mW/g



0 dB = 0.720mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 25 RB 12 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.387 mW/g

Right Tilt 10Mhz 25 RB 12 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

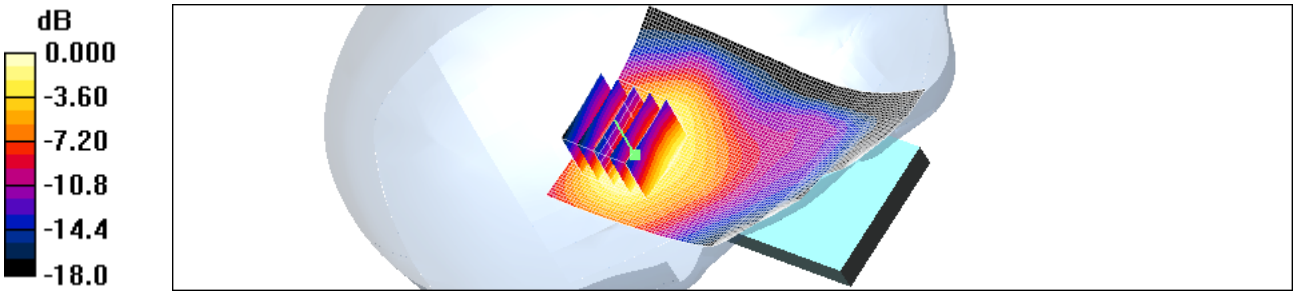
Reference Value = 13.3 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.214 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.405 mW/g



0 dB = 0.405mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 1 RB 0 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.473 mW/g

Right Tilt 10Mhz 1 RB 0 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

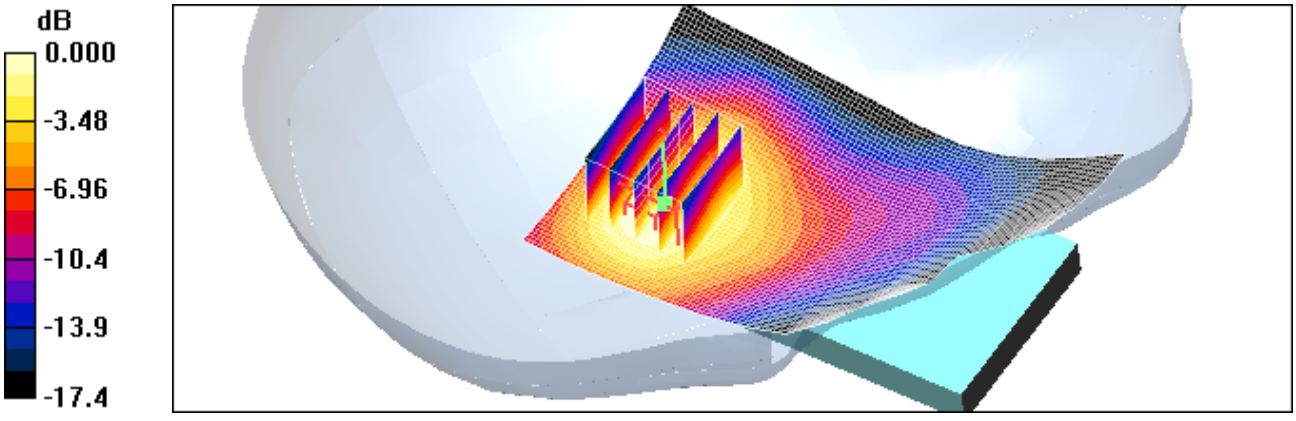
Reference Value = 14.3 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.258 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.477 mW/g



0 dB = 0.477mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 1 RB 49 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.534 mW/g

Right Tilt 10Mhz 1 RB 49 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

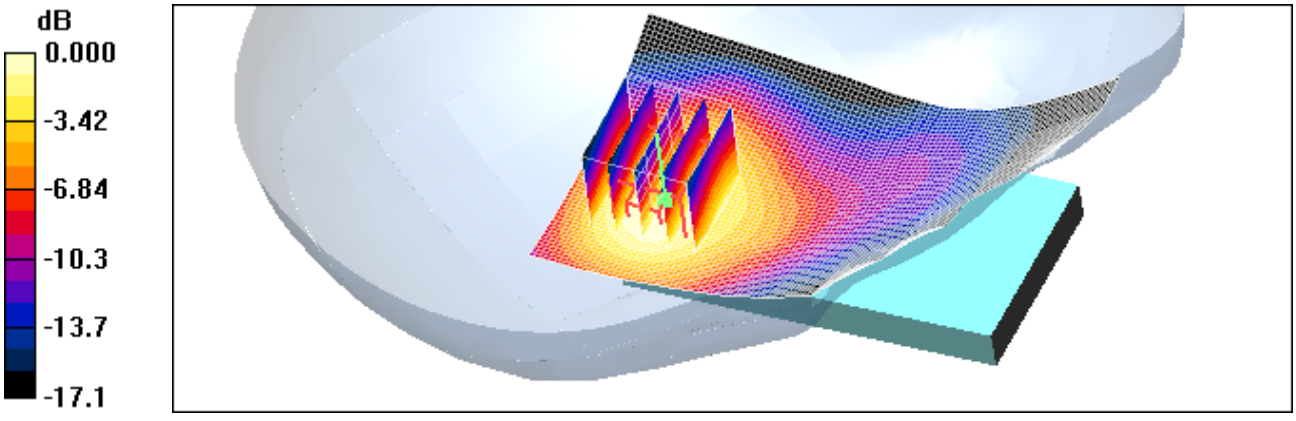
Reference Value = 15.3 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.858 W/kg

SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.295 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.543 mW/g



0 dB = 0.543mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left touch 10MHz 25RB 12 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.421 mW/g

Left touch 10MHz 25RB 12 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

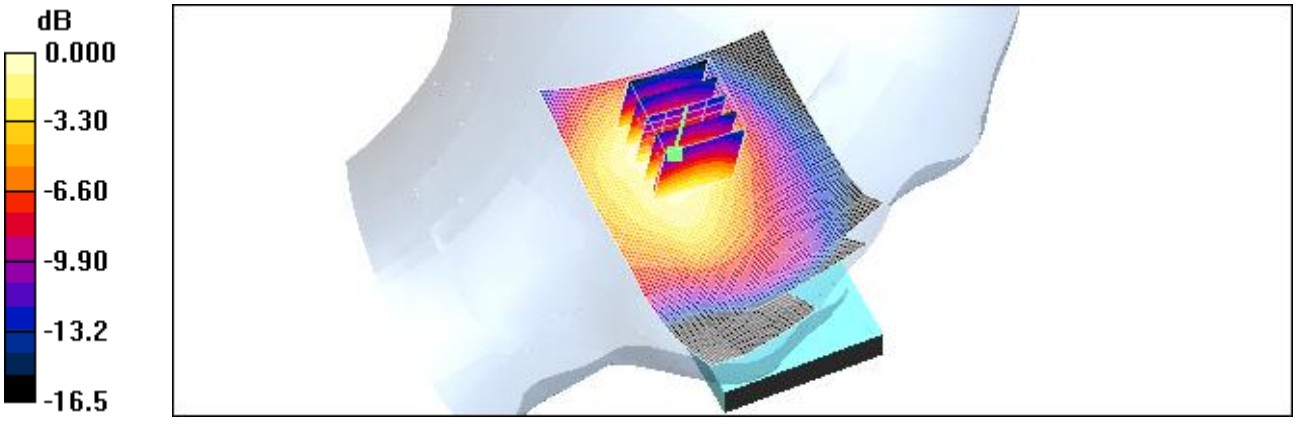
Reference Value = 11.8 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.524 W/kg

SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.228 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.408mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Left touch 10MHz 1RB 0offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.420 mW/g

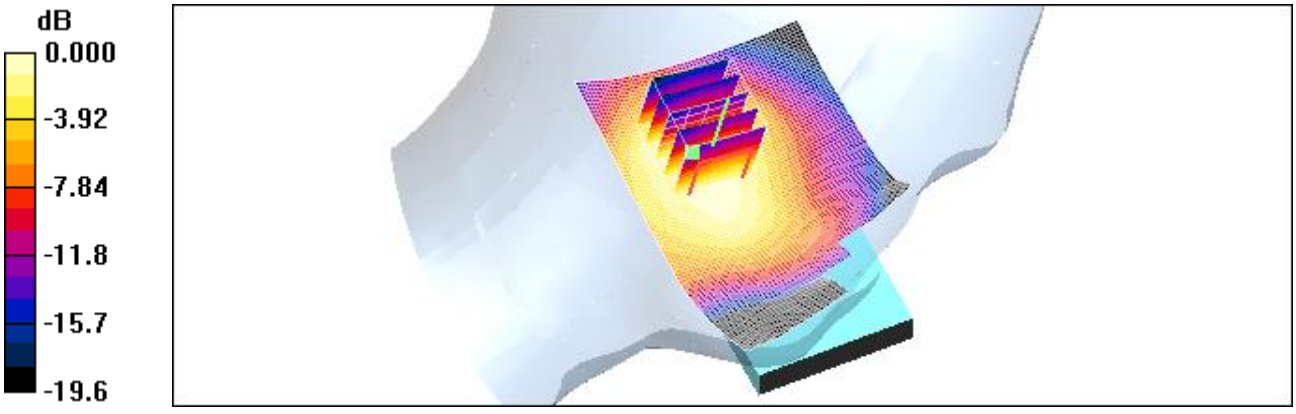
Left touch 10MHz 1RB 0offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.8 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 0.625 W/kg

SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.247 mW/g

Maximum value of SAR (measured) = 0.439 mW/g



0 dB = 0.439mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left touch 10MHz 1RB 49 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.411 mW/g

Left touch 10MHz 1RB 49 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

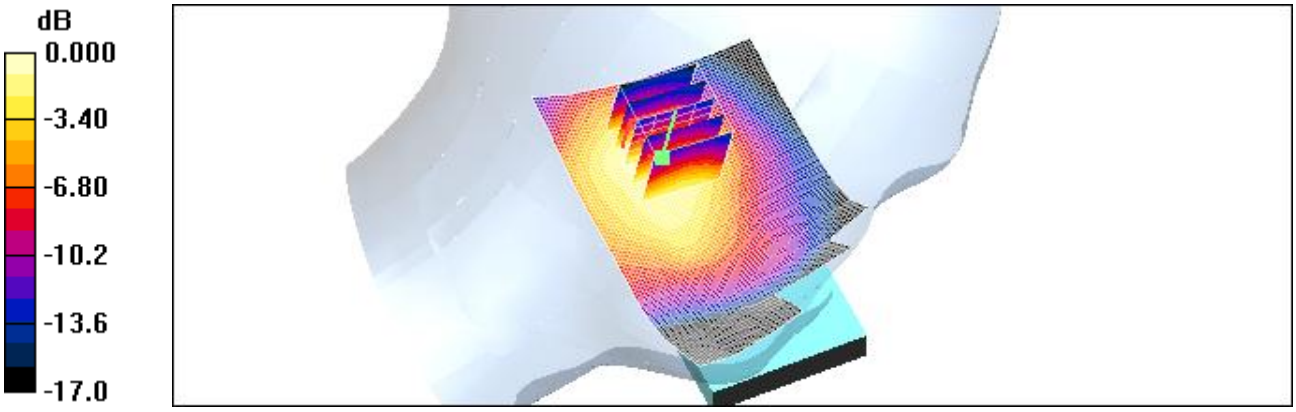
Reference Value = 12.2 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.542 W/kg

SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.223 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left tilt 10MHz 25RB 12 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.368 mW/g

Left tilt 10MHz 25RB 12 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

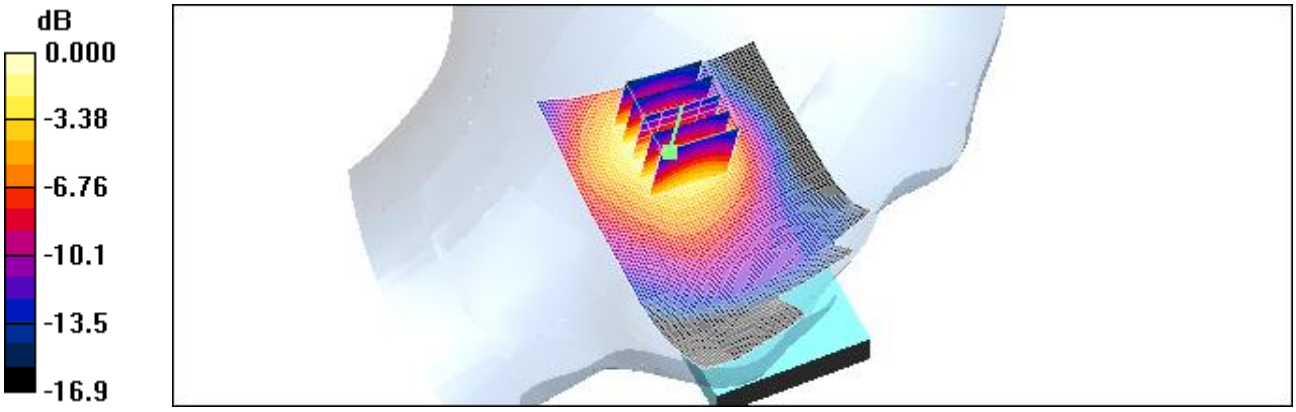
Reference Value = 13.1 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 0.476 W/kg

SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.188 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.362 mW/g



0 dB = 0.362mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left tilt 10MHz 1RB 0 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.420 mW/g

Left tilt 10MHz 1RB 0 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

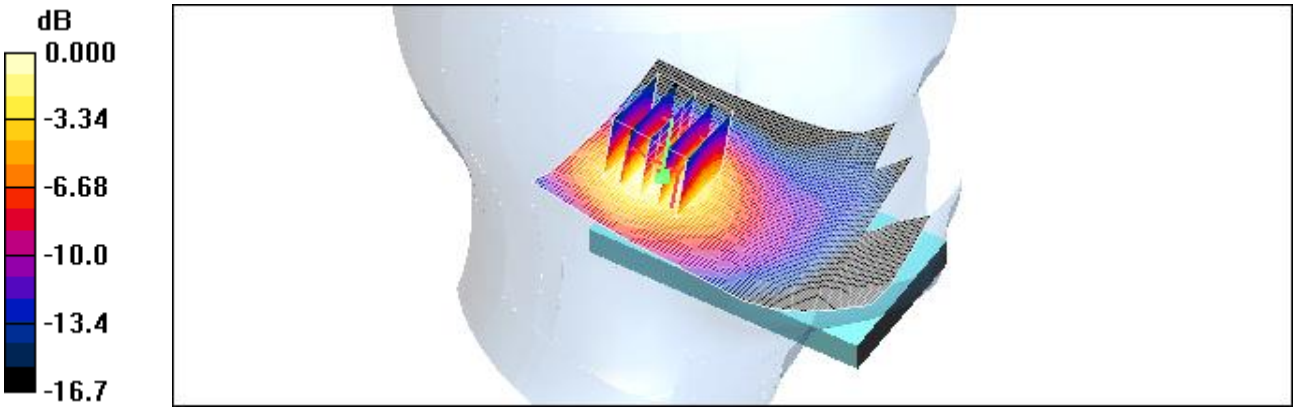
Reference Value = 14.5 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.580 W/kg

SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.211 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.415 mW/g



0 dB = 0.415mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Left tilt 10MHz 1RB 49 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.363 mW/g

Left tilt 10MHz 1RB 49 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

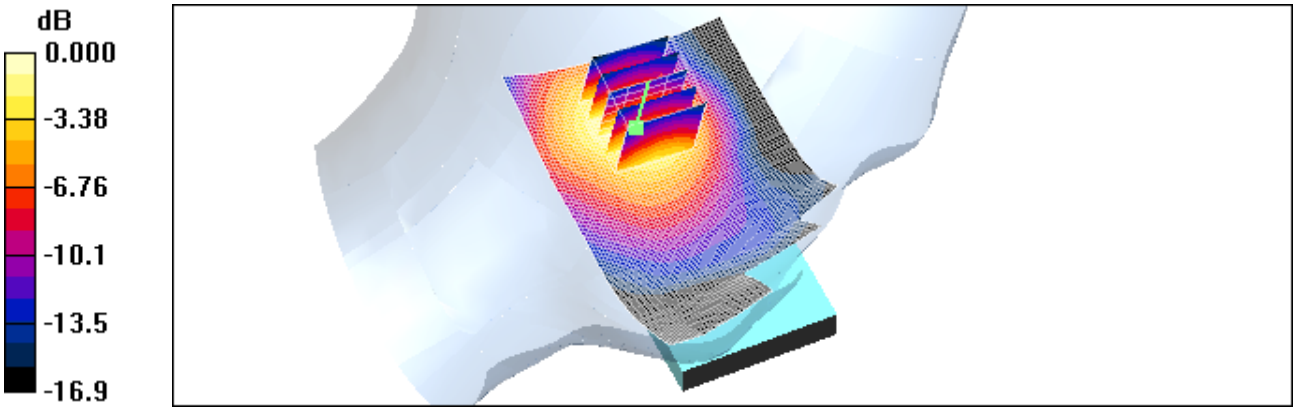
Reference Value = 13.7 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.470 W/kg

SAR(1 g) = 0.318 mW/g; SAR(10 g) = 0.186 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.350 mW/g



0 dB = 0.350mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 25 RB 12 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.506 mW/g

Right Touch 10Mhz 25 RB 12 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

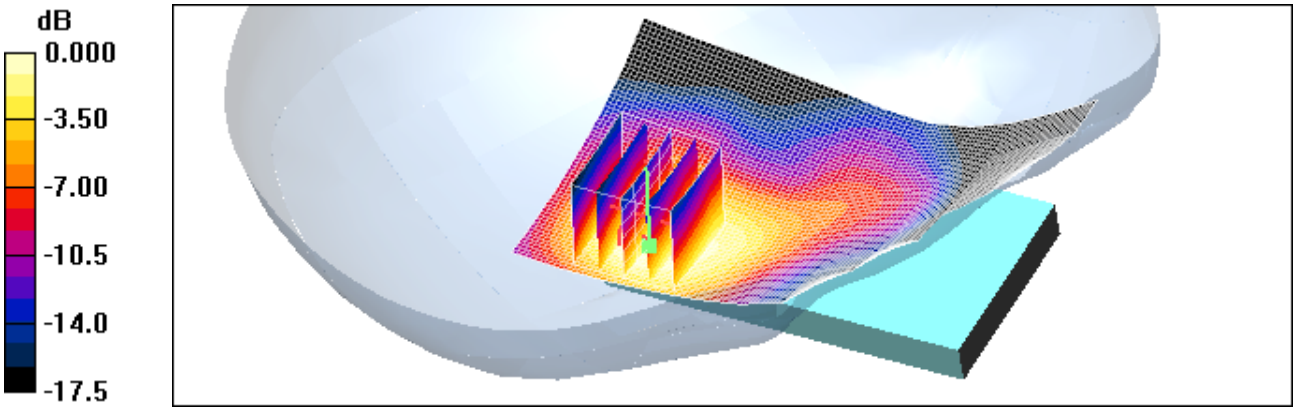
Reference Value = 8.20 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.249 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.456 mW/g



0 dB = 0.456mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 1 RB 0 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.579 mW/g

Right Touch 10Mhz 1 RB 0 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

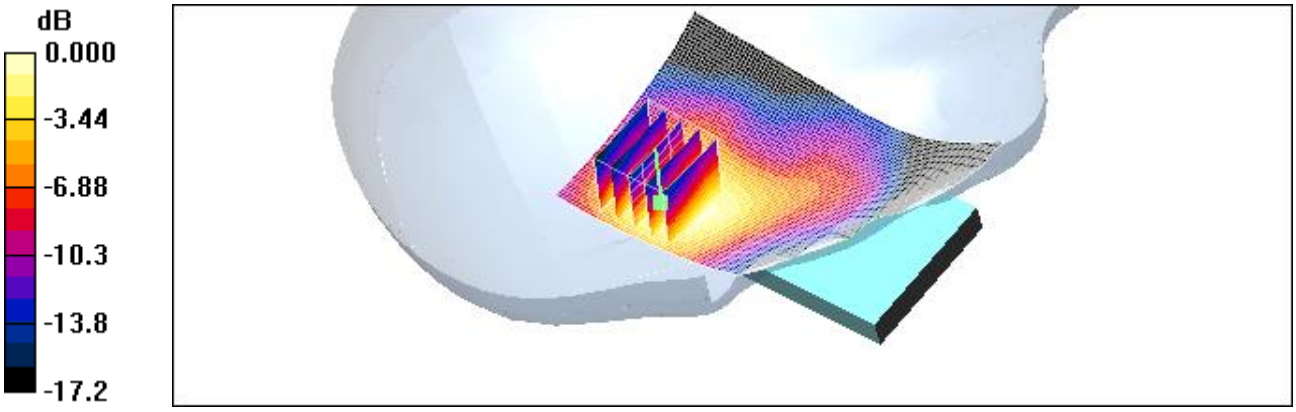
Reference Value = 8.59 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 0.783 W/kg

SAR(1 g) = 0.483 mW/g; SAR(10 g) = 0.289 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.523 mW/g



0 dB = 0.523mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 1 RB 49 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.648 mW/g

Right Touch 10Mhz 1 RB 49 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

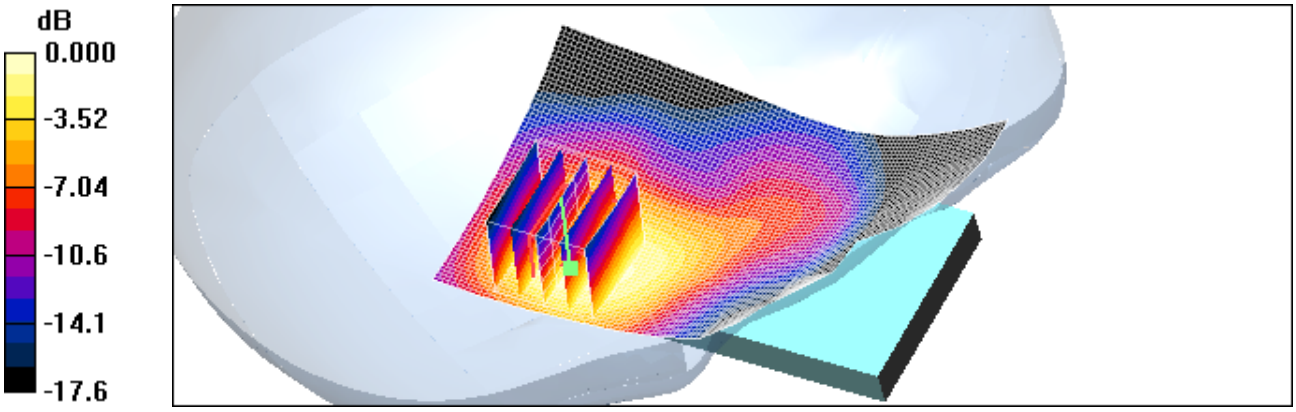
Reference Value = 9.38 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.972 W/kg

SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.346 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.634 mW/g



0 dB = 0.634mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 25 RB 12 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.323 mW/g

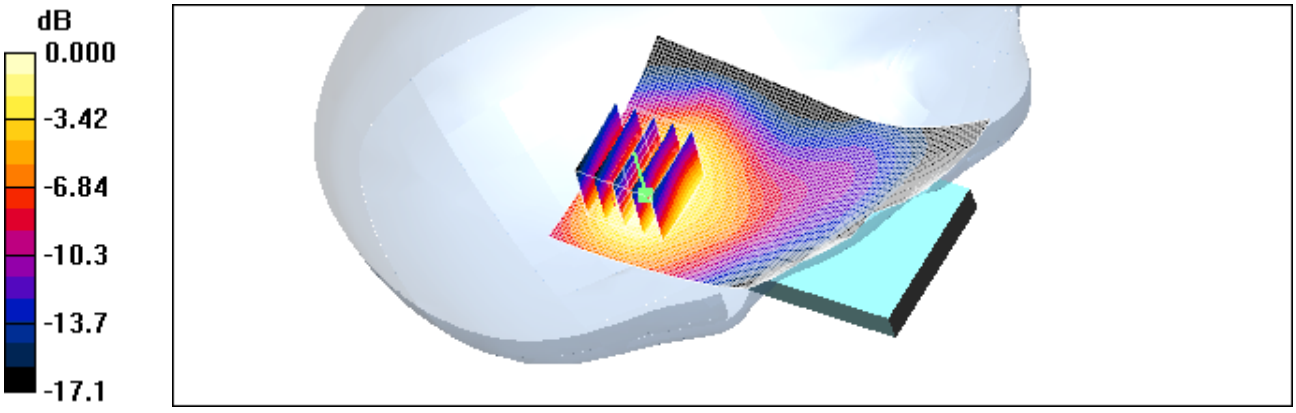
Right Tilt 10Mhz 25 RB 12 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 0.511 W/kg

SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.332 mW/g



0 dB = 0.332mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 1 RB 0 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.361 mW/g

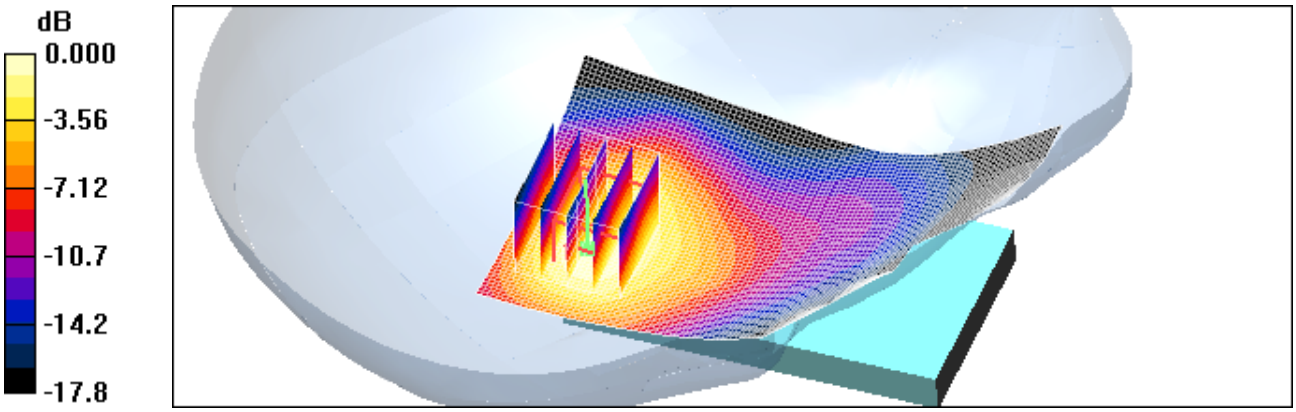
Right Tilt 10Mhz 1 RB 0 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.7 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 0.379 mW/g



0 dB = 0.379mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 10Mhz 1 RB 49 offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.400 mW/g

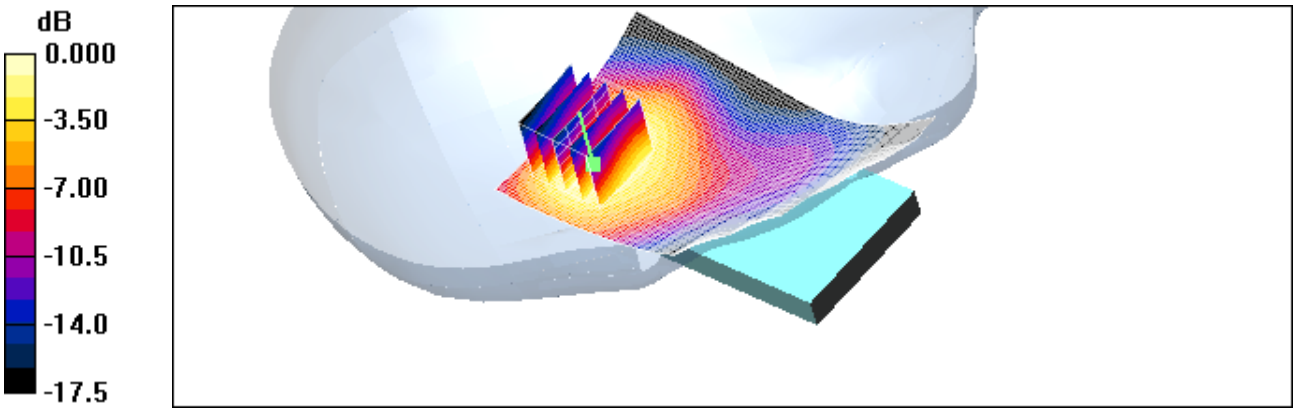
Right Tilt 10Mhz 1 RB 49 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.2 V/m; Power Drift = 0.163 dB

Peak SAR (extrapolated) = 0.633 W/kg

SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.219 mW/g

Maximum value of SAR (measured) = 0.413 mW/g



0 dB = 0.413mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Rear 25RB 12offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.492 mW/g

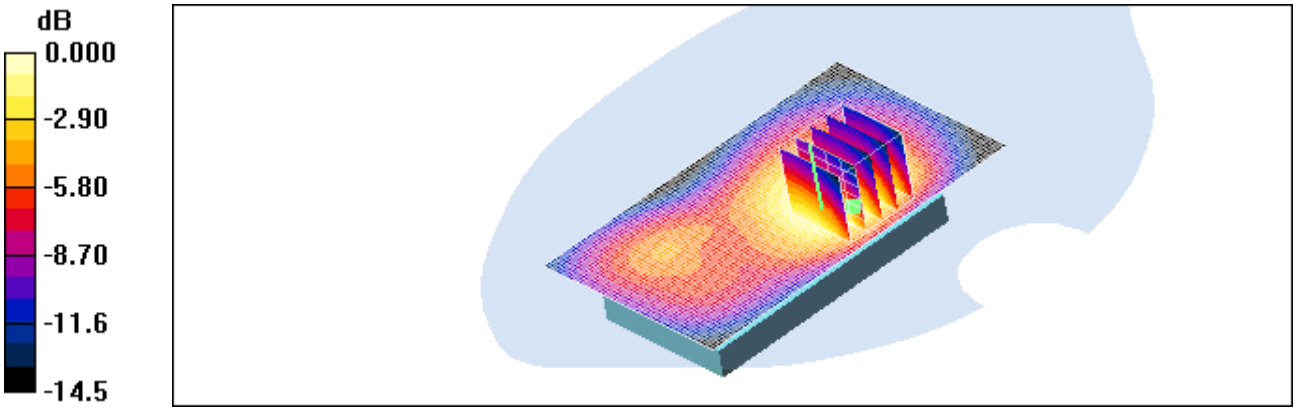
LTEBand 25 10MHz Hotspot Rear 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.1 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.638 W/kg

SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.291 mW/g

Maximum value of SAR (measured) = 0.464 mW/g



0 dB = 0.464mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Rear 1RB 0offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.592 mW/g

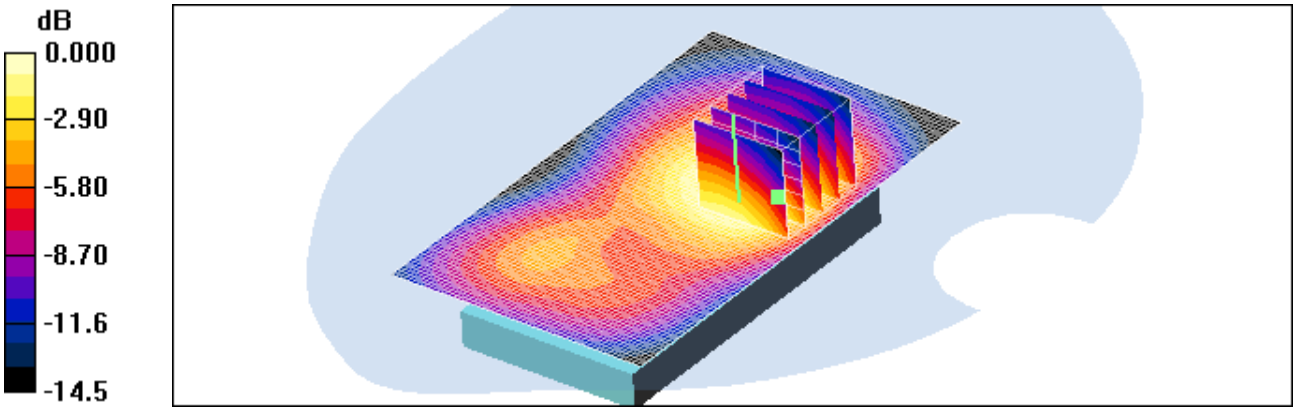
LTEBand 25 10MHz Hotspot Rear 1RB 0offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.5 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.759 W/kg

SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.353 mW/g

Maximum value of SAR (measured) = 0.558 mW/g



0 dB = 0.558mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Jul.8 , 2012
Separation Distance	1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

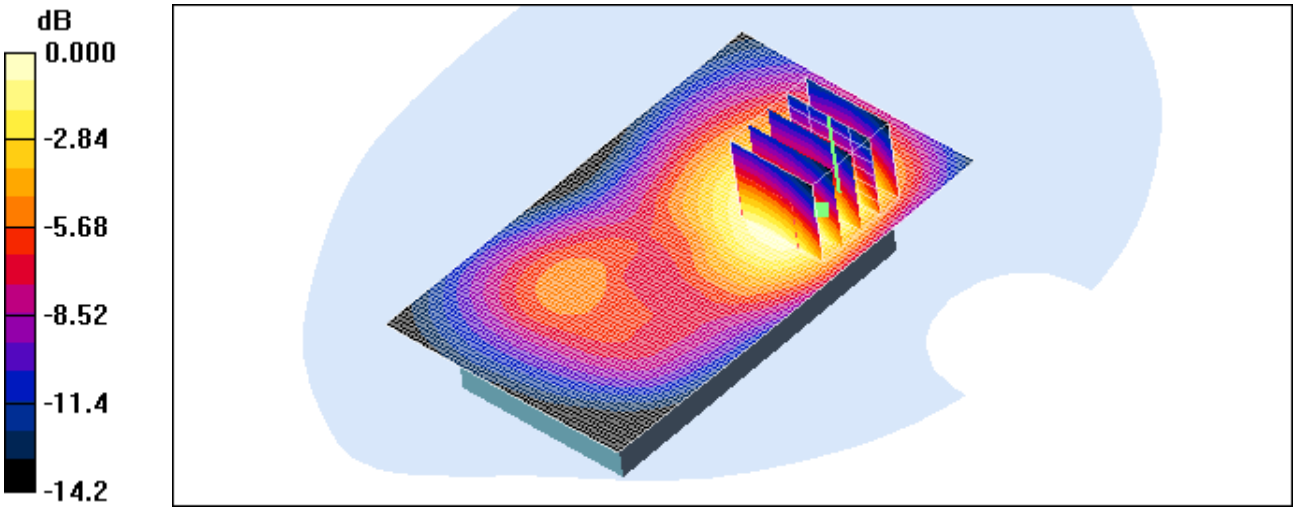
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

LTEBand 25 10MHz Hotspot Back 1RB 49offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.639 mW/g

LTEBand 25 10MHz Hotspot Back 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.838 W/kg
SAR(1 g) = 0.571 mW/g; SAR(10 g) = 0.373 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.615 mW/g



0 dB = 0.615mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 25RB 12offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.257 mW/g

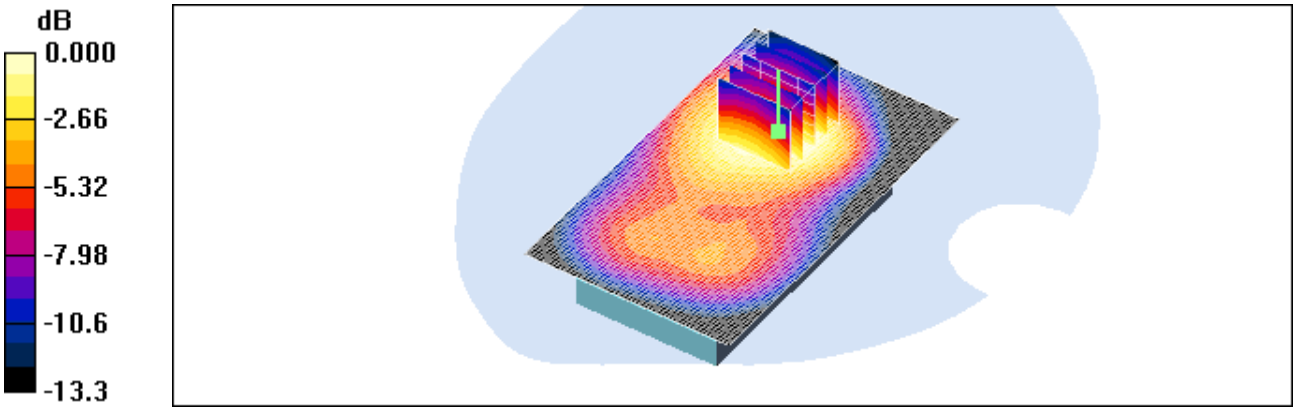
LTEBand 25 10MHz Hotspot Front 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.8 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 0.284 W/kg

SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.146 mW/g

Maximum value of SAR (measured) = 0.230 mW/g



0 dB = 0.230mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 1RB 0offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.286 mW/g

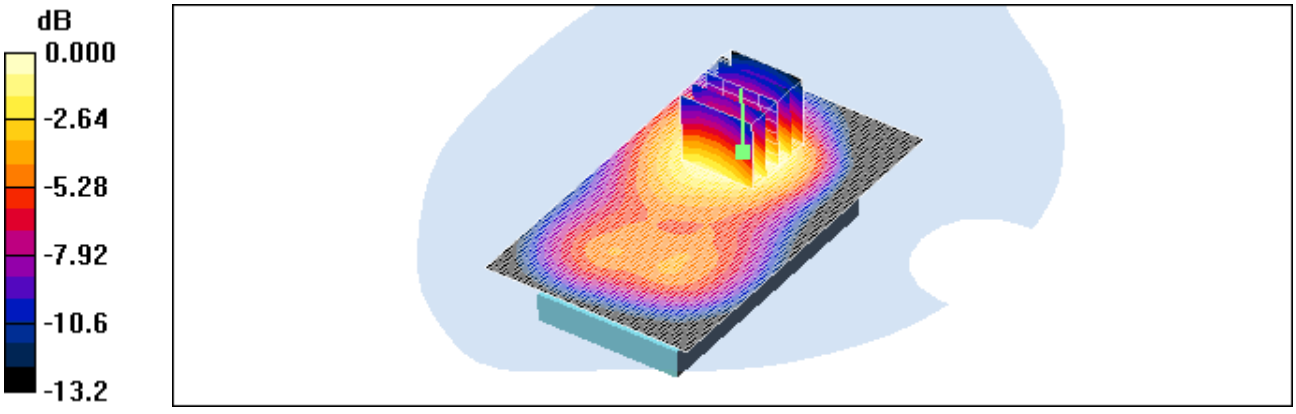
LTEBand 25 10MHz Hotspot Front 1RB 0offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.6 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.350 W/kg

SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.180 mW/g

Maximum value of SAR (measured) = 0.285 mW/g



0 dB = 0.285mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 1RB 49offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.325 mW/g

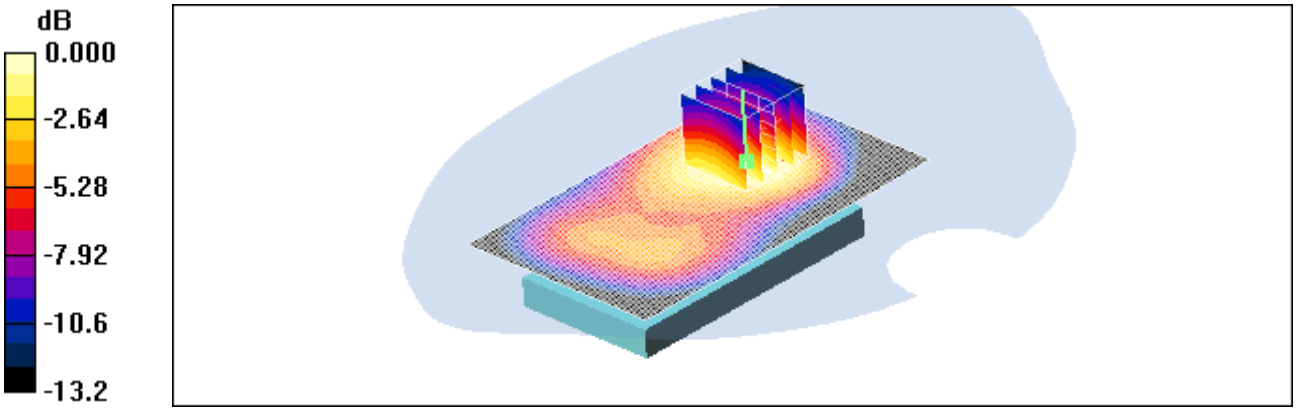
LTEBand 25 10MHz Hotspot Front 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.6 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.396 W/kg

SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.202 mW/g

Maximum value of SAR (measured) = 0.321 mW/g



0 dB = 0.321mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Jul.8 , 2012
Separation Distance	1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 25RB 12offset QPSK 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.317 mW/g

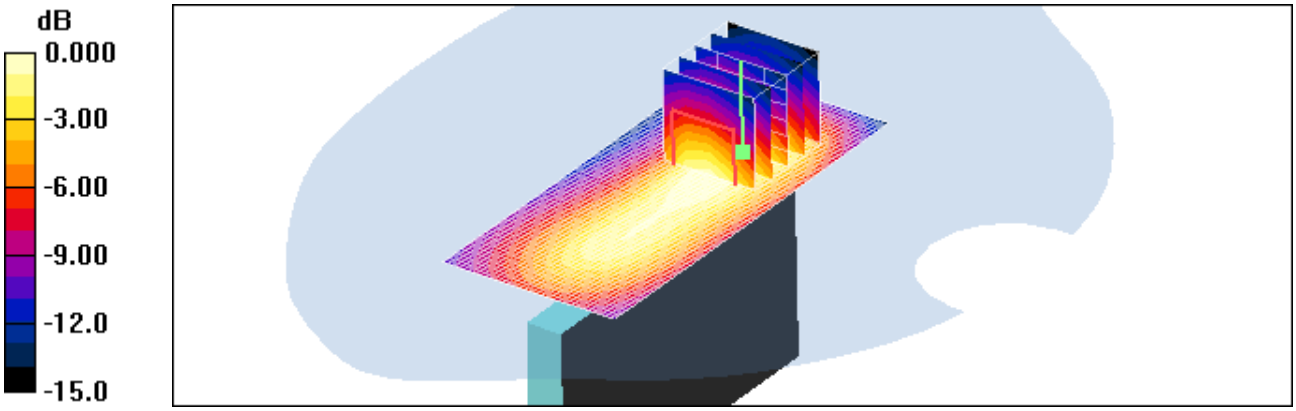
LTEBand 25 10MHz Hotspot Left side 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.4 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.375 W/kg

SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.138 mW/g

Maximum value of SAR (measured) = 0.253 mW/g



0 dB = 0.253mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 1RB 0offset QPSK 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.337 mW/g

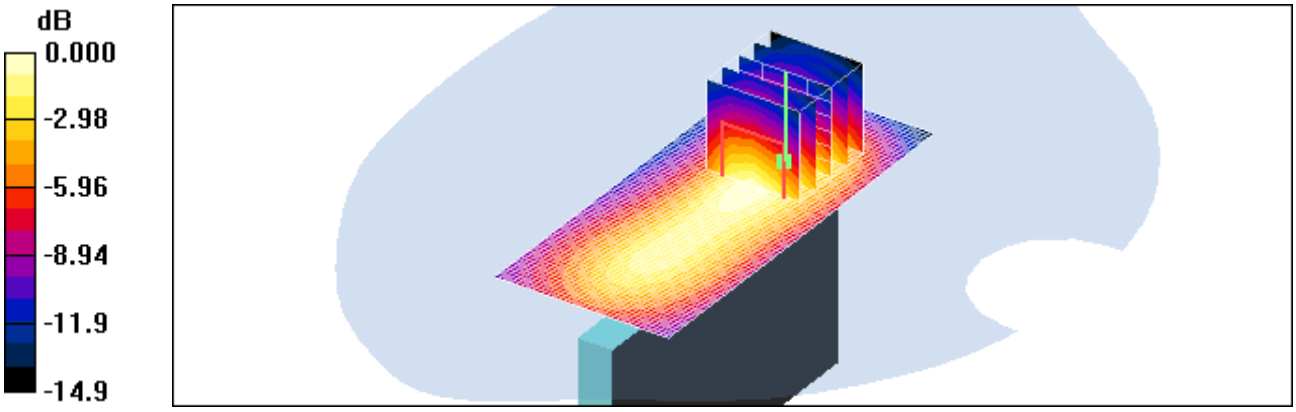
LTEBand 25 10MHz Hotspot Left side 1RB 0offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.5 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.448 W/kg

SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.167 mW/g

Maximum value of SAR (measured) = 0.308 mW/g



0 dB = 0.308mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 1RB 49offset QPSK 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.388 mW/g

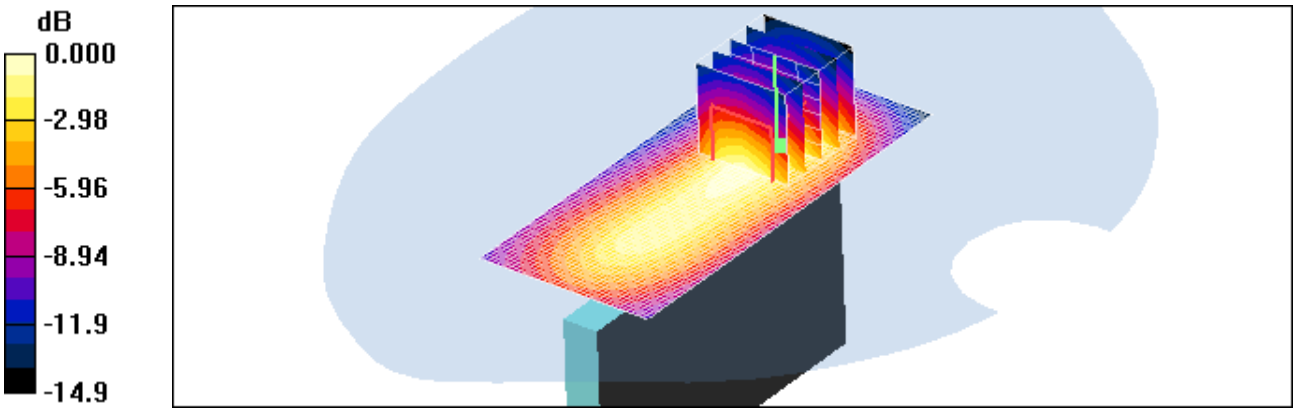
LTEBand 25 10MHz Hotspot Left side 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.511 W/kg

SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.355 mW/g



0 dB = 0.355mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 25RB 12offset QPSK 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.110 mW/g

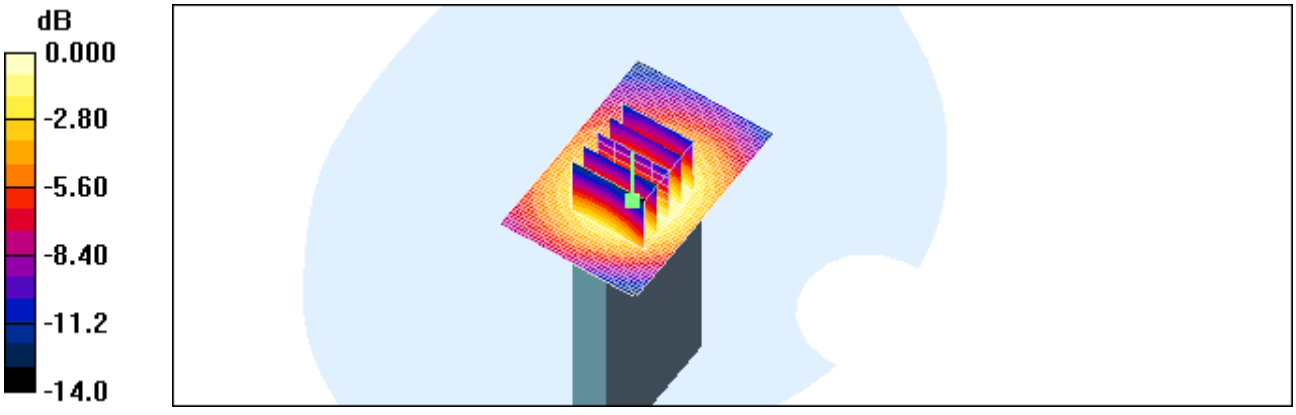
LTEBand 25 10MHz Hotspot Top side 25RB 12offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.47 V/m; Power Drift = 0.135 dB

Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.105 mW/g



0 dB = 0.105mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 1RB 0 offset QPSK 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.138 mW/g

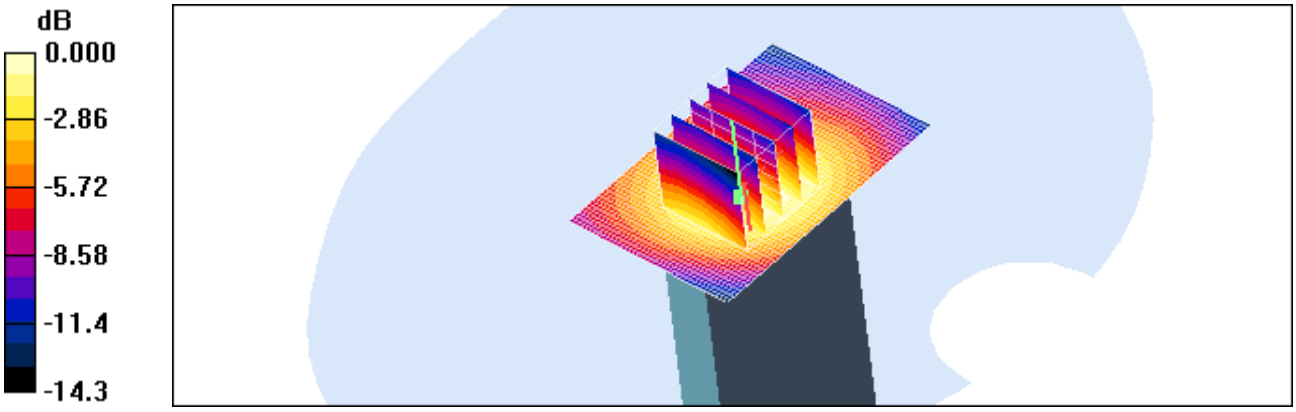
LTEBand 25 10MHz Hotspot Top side 1RB 0 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.59 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.176 W/kg

SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.084 mW/g

Maximum value of SAR (measured) = 0.137 mW/g



0 dB = 0.137mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Jul.8 , 2012
Separation Distance	1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 1RB 49offset QPSK 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.150 mW/g

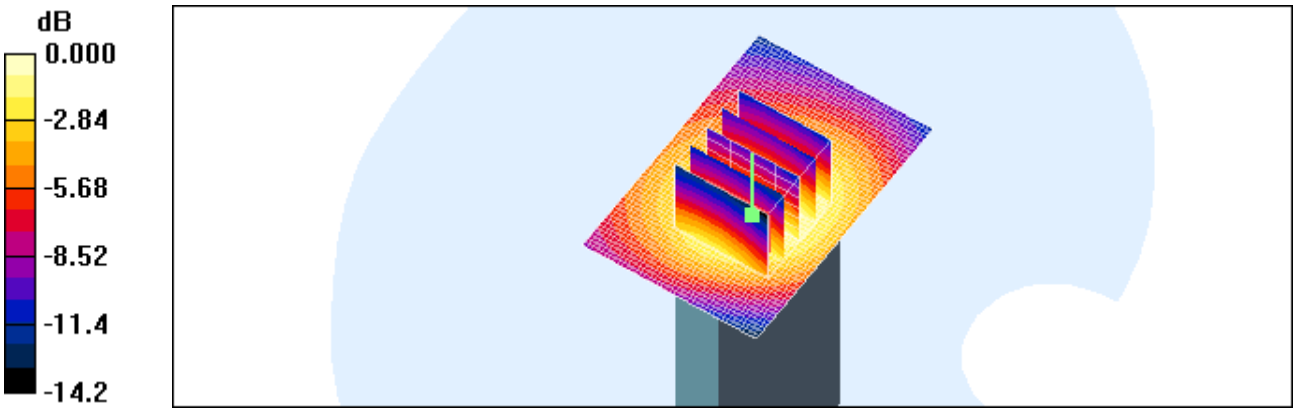
LTEBand 25 10MHz Hotspot Top side 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.98 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.189 W/kg

SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.147 mW/g



0 dB = 0.147mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Rear 25RB 12offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.434 mW/g

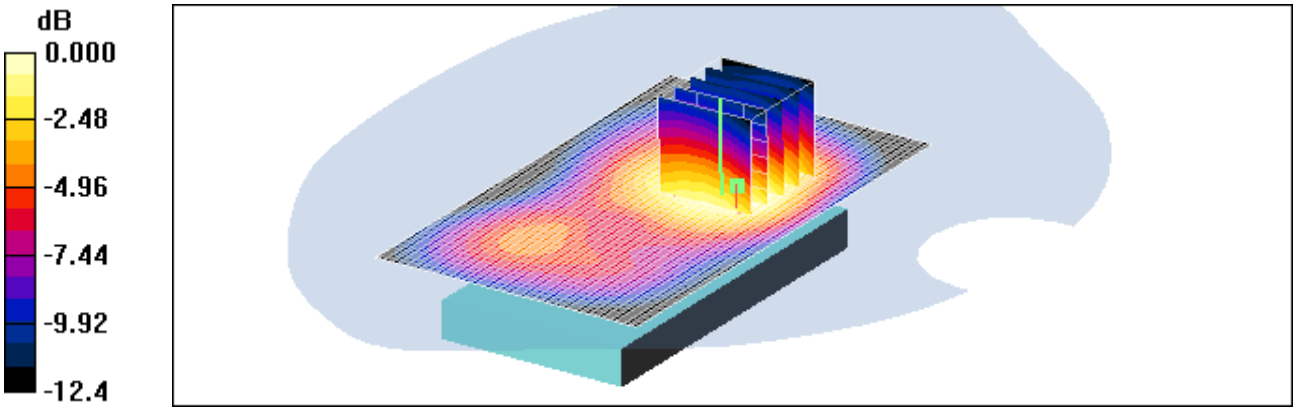
LTEBand 25 10MHz Hotspot Rear 25RB 12offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.9 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.559 W/kg

SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.255 mW/g

Maximum value of SAR (measured) = 0.410 mW/g



0 dB = 0.410mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Rear 1RB 0offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.448 mW/g

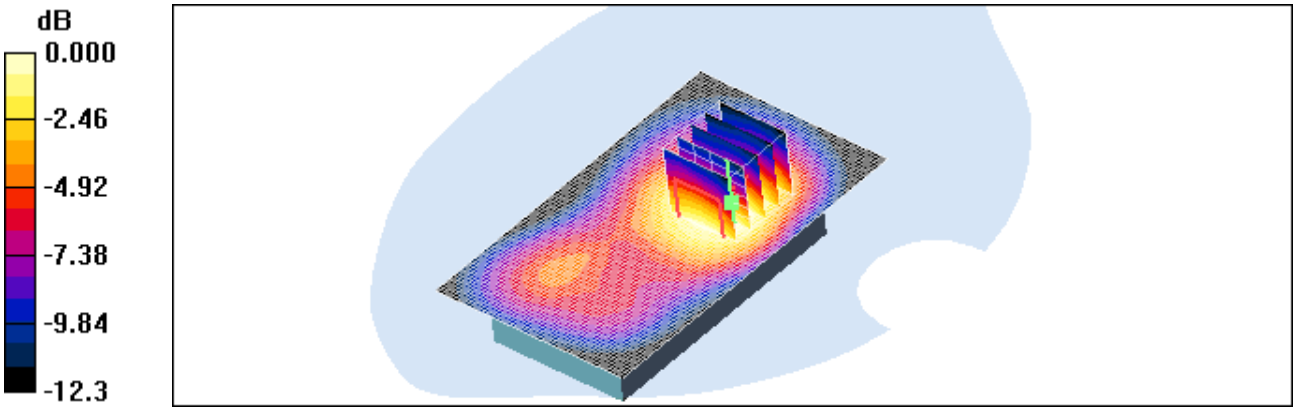
LTEBand 25 10MHz Hotspot Rear 1RB 0offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.6 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.599 W/kg

SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.272 mW/g

Maximum value of SAR (measured) = 0.435 mW/g



0 dB = 0.435mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Rear 1RB 49offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.502 mW/g

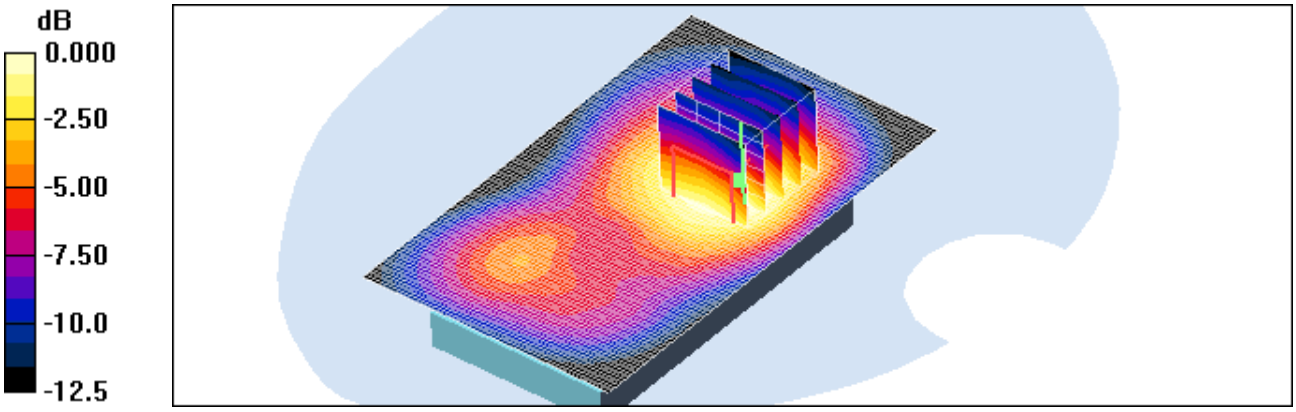
LTEBand 25 10MHz Hotspot Rear 1RB 49offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.5 V/m; Power Drift = 0.167 dB

Peak SAR (extrapolated) = 0.652 W/kg

SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.292 mW/g

Maximum value of SAR (measured) = 0.477 mW/g



0 dB = 0.477mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 25RB 12offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.216 mW/g

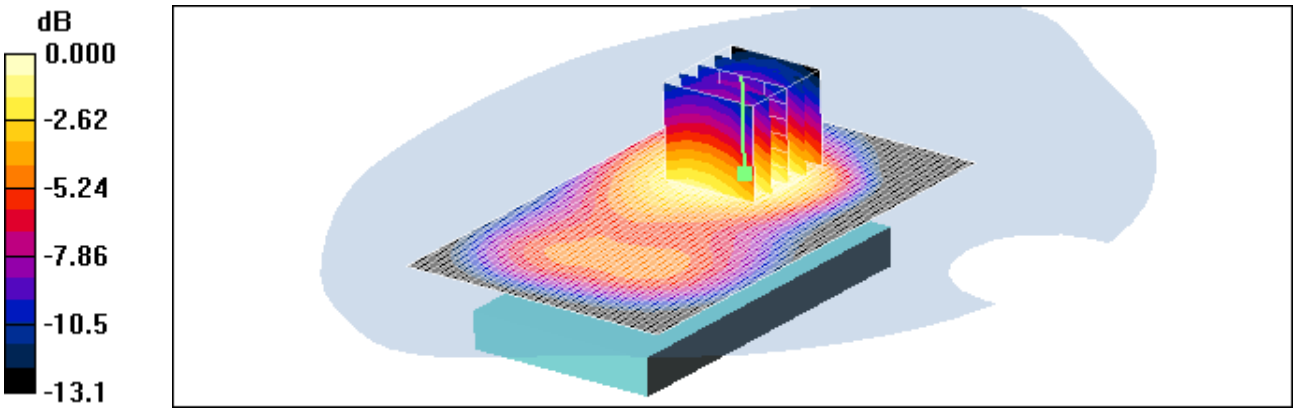
LTEBand 25 10MHz Hotspot Front 25RB 12offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.6 V/m; Power Drift = 0.129 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.135 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 BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 1RB 0offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.219 mW/g

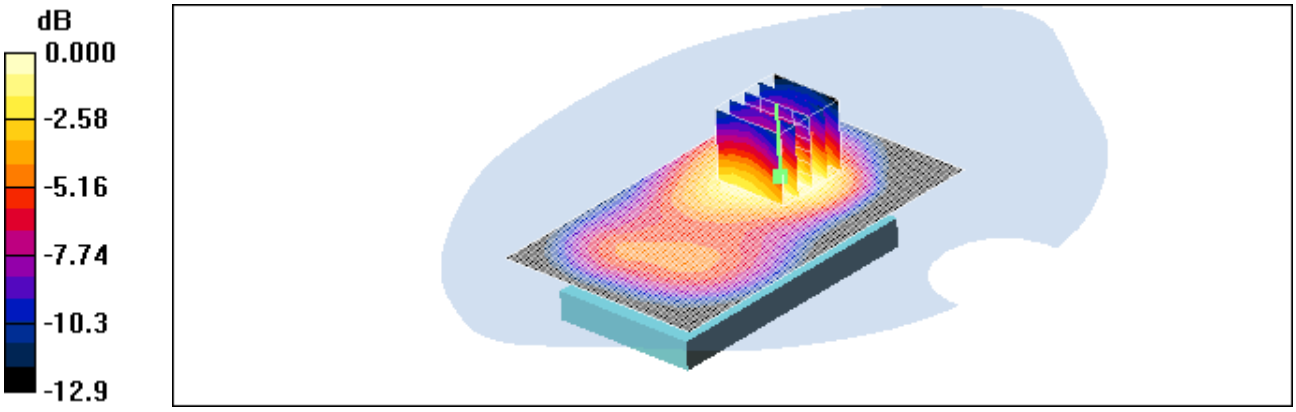
LTEBand 25 10MHz Hotspot Front 1RB 0offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 0.281 W/kg

SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.143 mW/g

Maximum value of SAR (measured) = 0.226 mW/g



0 dB = 0.226mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Front 1RB 49offset 16QAM 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.269 mW/g

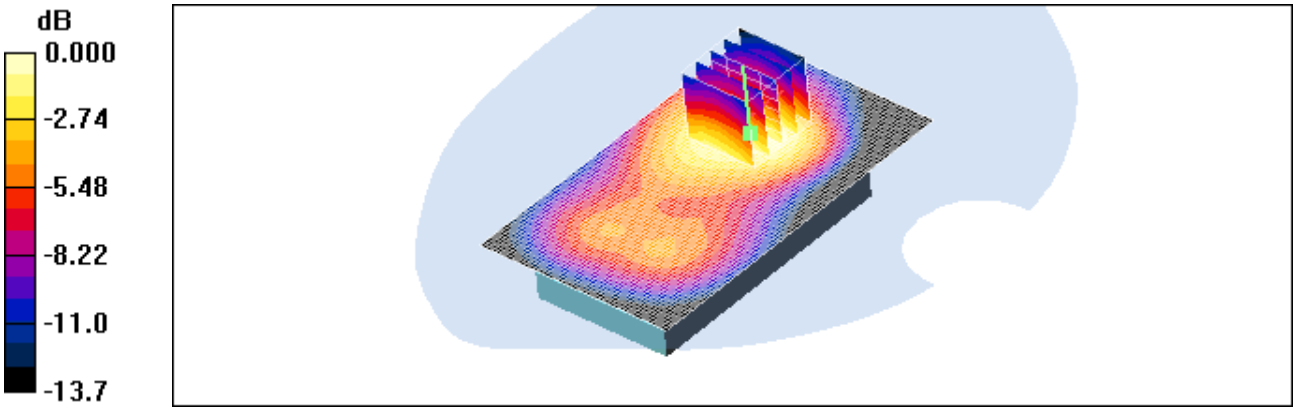
LTEBand 25 10MHz Hotspot Front 1RB 49offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.8 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 0.336 W/kg

SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.254 mW/g



0 dB = 0.254mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 25RB 12offset 16QAM 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.250 mW/g

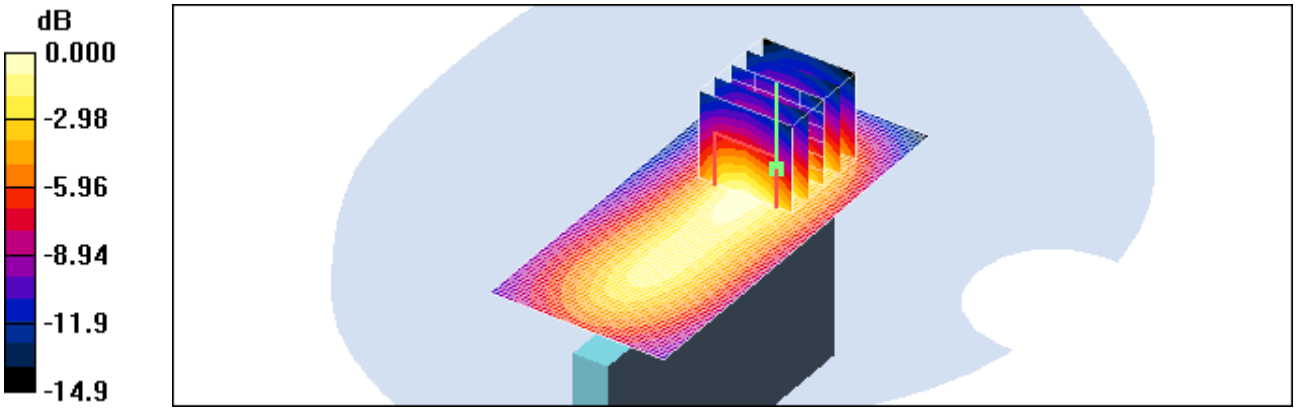
LTEBand 25 10MHz Hotspot Left side 25RB 12offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.335 W/kg

SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.230 mW/g



0 dB = 0.230mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 1RB 0offset 16QAM 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.277 mW/g

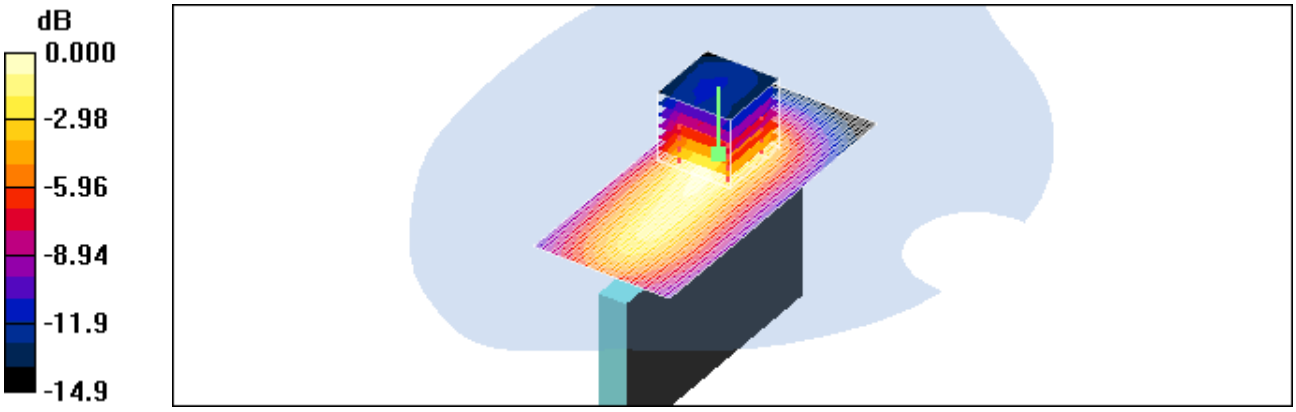
LTEBand 25 10MHz Hotspot Left side 1RB 0offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.3 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.397 W/kg

SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.146 mW/g

Maximum value of SAR (measured) = 0.273 mW/g



0 dB = 0.273mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: side ; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Left side 1RB 0offset 16QAM 26365/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.316 mW/g

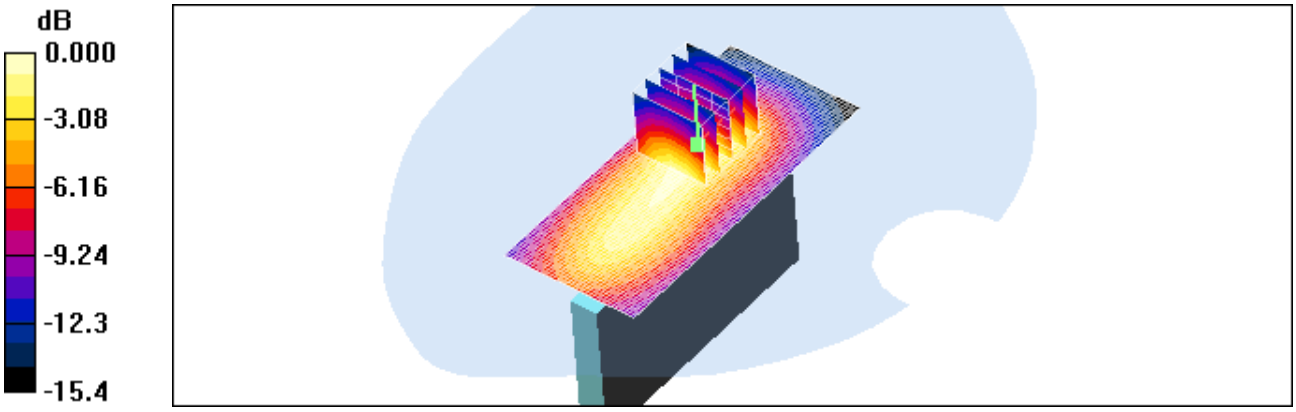
LTEBand 25 10MHz Hotspot Left side 1RB 0offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.2 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 0.453 W/kg

SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.312 mW/g



0 dB = 0.312mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012
Separation Distance 1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 25RB 12offset 16QAM 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.104 mW/g

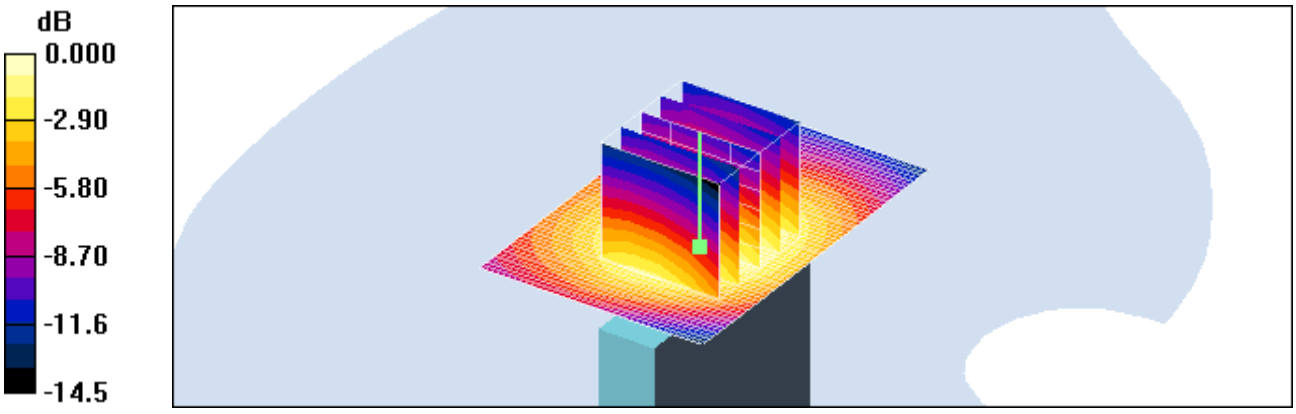
LTEBand 25 10MHz Hotspot Top side 25RB 12offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.90 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.130 W/kg

SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.062 mW/g

Maximum value of SAR (measured) = 0.100 mW/g



0 dB = 0.100mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Jul.8 , 2012
Separation Distance	1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 1RB 0 offset 16QAM 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.120 mW/g

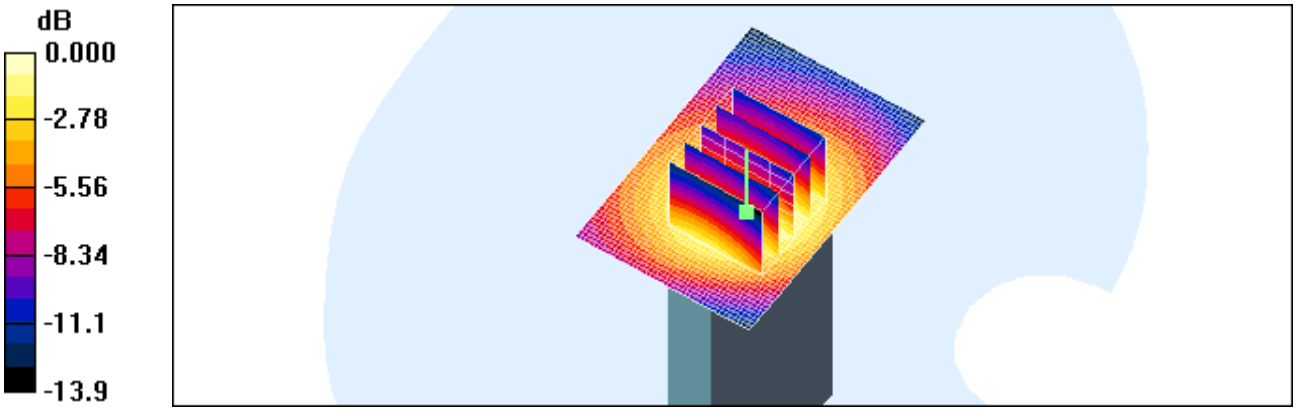
LTEBand 25 10MHz Hotspot Top side 1RB 0 offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.49 V/m; Power Drift = 0.127 dB

Peak SAR (extrapolated) = 0.151 W/kg

SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.071 mW/g

Maximum value of SAR (measured) = 0.116 mW/g



0 dB = 0.116mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Jul.8 , 2012
Separation Distance	1.0 cm

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

LTEBand 25 10MHz Hotspot Top side 1RB 49offset 16QAM 26365/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.129 mW/g

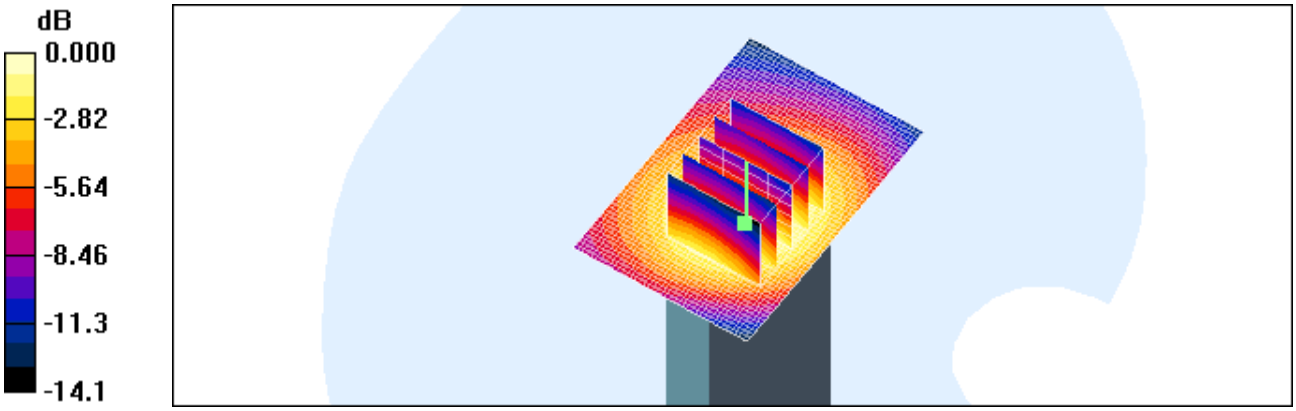
LTEBand 25 10MHz Hotspot Top side 1RB 49offset 16QAM 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.85 V/m; Power Drift = 0.081 dB

Peak SAR (extrapolated) = 0.162 W/kg

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.077 mW/g

Maximum value of SAR (measured) = 0.125 mW/g



0 dB = 0.125mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jul.7 , 2012

DUT: LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.39 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 10Mhz 1 RB 49 offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.814 mW/g

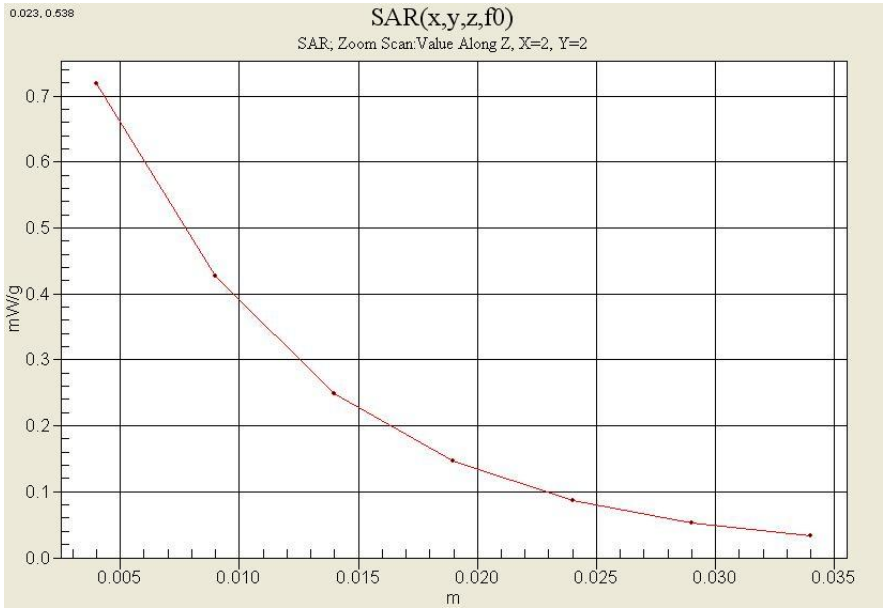
Right Touch 10Mhz 1 RB 49 offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.3 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.400 mW/g

Maximum value of SAR (measured) = 0.720 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS BC10 CDMA and LTE Phone with Bluetooth and WLAN
Liquid Temperature: 21.2 ℃
Ambient Temperature: 21.4 ℃
Test Date: Jul.8 , 2012

DUT: LG-LS840; Type: bar; Serial: #1

Communication System: LTE band 25; Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

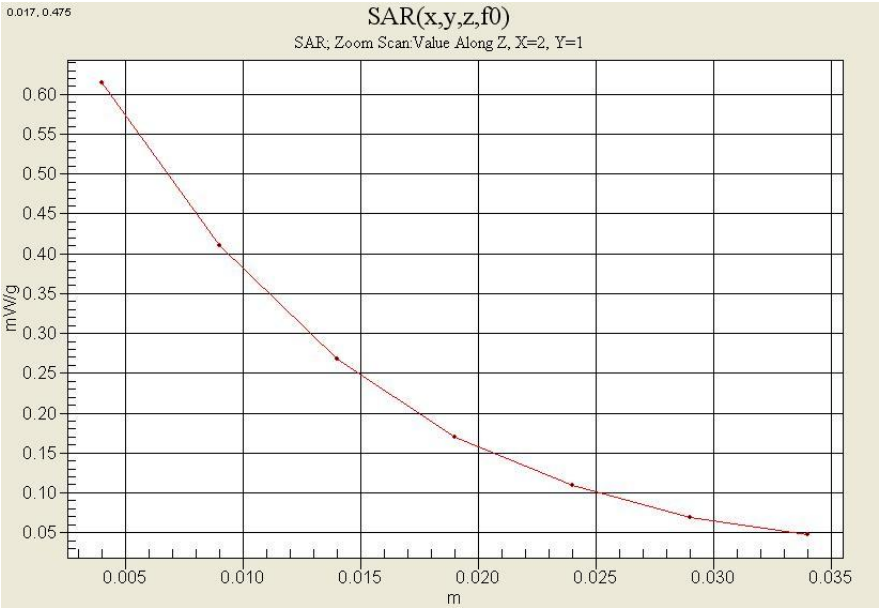
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

LTEBand 25 10MHz Hotspot Back 1RB 49offset QPSK 26365/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.639 mW/g

LTEBand 25 10MHz Hotspot Back 1RB 49offset QPSK 26365/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.838 W/kg
SAR(1 g) = 0.571 mW/g; SAR(10 g) = 0.373 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.615 mW/g



Attachment 2. – Dipole Validation Plots

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.1 ℃

Test Date: Jul.7 , 2012

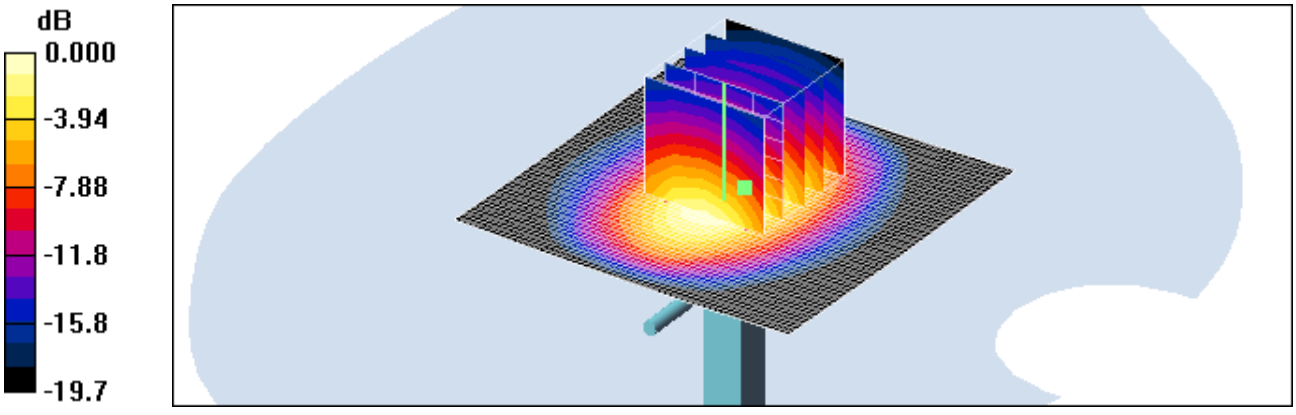
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d023

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.69 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.2 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 6.70 W/kg
SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.06 mW/g
Maximum value of SAR (measured) = 4.41 mW/g



0 dB = 4.41mW/g

■ Validation Data (1900 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 ℃

Test Date: Jul.8 , 2012

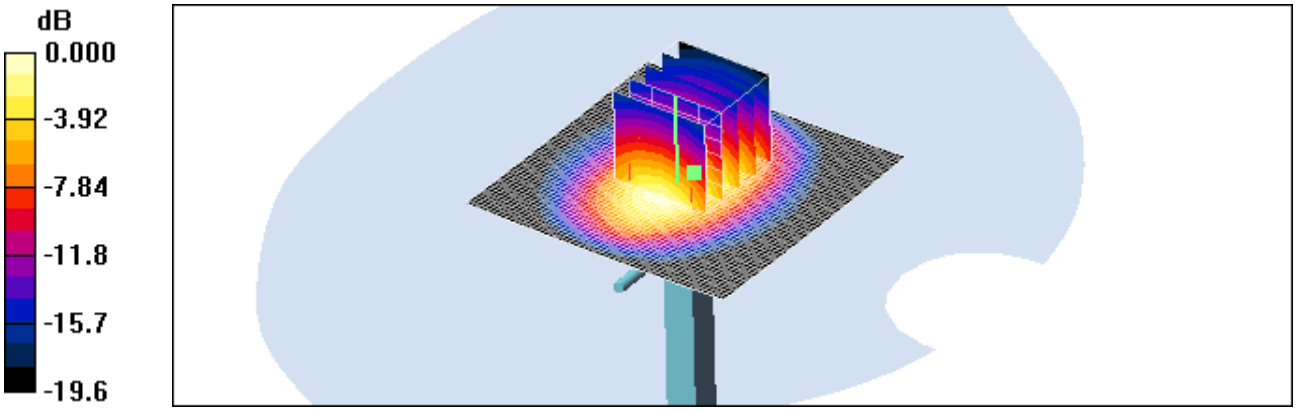
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d023

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.99 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.1 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 6.59 W/kg
SAR(1 g) = 4.15 mW/g; SAR(10 g) = 2.2 mW/g
Maximum value of SAR (measured) = 4.71 mW/g



0 dB = 4.71mW/g

■ Dielectric Parameter (LTE25 1900MHz Head)

Title	LS840
SubTitle	LTE 25 1900MHz (Head)
Test Date	Jul.7 , 2012

Frequency	e'	e''
1800000000.0000	40.1747	13.0390
1810000000.0000	40.1482	13.0747
1820000000.0000	40.1184	13.1081
1830000000.0000	40.0725	13.1345
1840000000.0000	40.0439	13.1565
1850000000.0000	40.0077	13.1748
1860000000.0000	39.9610	13.1981
1870000000.0000	39.9266	13.2385
1880000000.0000	39.8846	13.2811
1890000000.0000	39.8457	13.3015
1900000000.0000	39.8019	13.3415
1910000000.0000	39.7595	13.3581
1920000000.0000	39.7196	13.3872
1930000000.0000	39.6879	13.4002
1940000000.0000	39.6475	13.4000
1950000000.0000	39.6107	13.4418
1960000000.0000	39.5524	13.4550
1970000000.0000	39.5207	13.4874
1980000000.0000	39.4732	13.5307
1990000000.0000	39.4379	13.5539
2000000000.0000	39.3980	13.5599

■ Dielectric Parameter (LTE25 1900MHz Body)

Title LS840
SubTitle LTE25 1900MHz (Body)
Test Date Jul.8 , 2012

Frequency	e'	e''
1800000000.0000	53.1317	14.2383
1810000000.0000	53.1520	14.3041
1820000000.0000	53.1243	14.3458
1830000000.0000	53.0904	14.4442
1840000000.0000	53.0988	14.4761
1850000000.0000	53.0491	14.5305
1860000000.0000	52.9770	14.5615
1870000000.0000	52.9177	14.5598
1880000000.0000	52.8782	14.5700
1890000000.0000	52.8161	14.5975
1900000000.0000	52.7747	14.6176
1910000000.0000	52.7403	14.6355
1920000000.0000	52.3452	14.5624
1930000000.0000	52.6587	14.6980
1940000000.0000	52.6314	14.7181
1950000000.0000	52.6021	14.7799
1960000000.0000	52.5543	14.8122
1970000000.0000	52.5567	14.8953
1980000000.0000	52.5208	14.9207
1990000000.0000	52.5180	14.9256
2000000000.0000	51.8143	14.7625

Attachment 3. – Probe Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client HCT (Dymstec) **Certificate No: ET3-1609_Mar12**

CALIBRATION CERTIFICATE

Object ET3DV6 - SN:1609

Calibration procedure(s) QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: March 19, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 19, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1609

Manufactured: July 27, 2001
Calibrated: March 19, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

ET3DV6– SN:1609 March 19, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.01	1.81	1.82	± 10.1 %
DCP (mV)[B]	97.7	97.4	98.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	112.2	±2.2 %
			Y	0.00	0.00	1.00	107.9	
			Z	0.00	0.00	1.00	109.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.32	7.32	7.32	0.21	2.26	± 13.4 %
750	41.9	0.89	6.68	6.68	6.68	0.39	2.46	± 12.0 %
835	41.5	0.90	6.36	6.36	6.36	0.32	2.79	± 12.0 %
900	41.5	0.97	6.25	6.25	6.25	0.33	3.00	± 12.0 %
1450	40.5	1.20	5.48	5.48	5.48	0.44	3.00	± 12.0 %
1750	40.1	1.37	5.50	5.50	5.50	0.74	2.42	± 12.0 %
1900	40.0	1.40	5.26	5.26	5.26	0.80	2.18	± 12.0 %
1950	40.0	1.40	5.04	5.04	5.04	0.80	2.09	± 12.0 %
2450	39.2	1.80	4.52	4.52	4.52	0.80	1.90	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Body Tissue Simulating Media

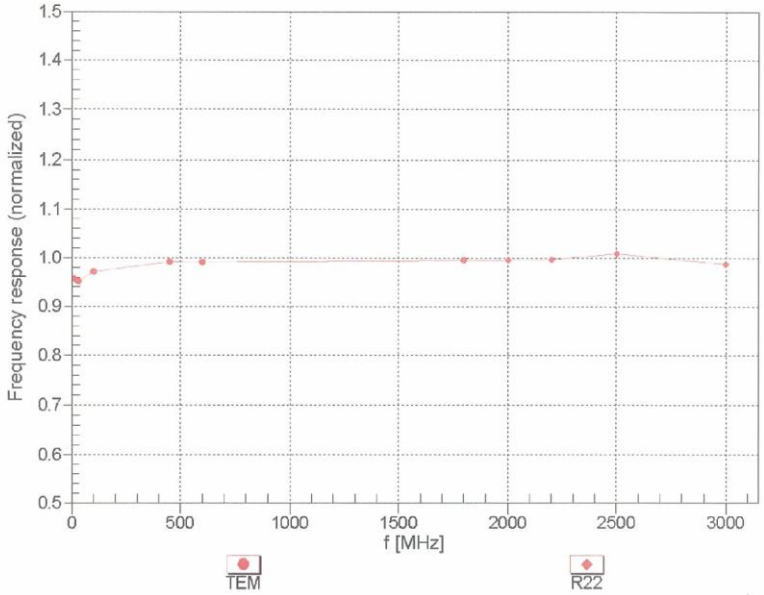
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.73	7.73	7.73	0.15	2.32	± 13.4 %
750	55.5	0.96	6.38	6.38	6.38	0.29	3.00	± 12.0 %
835	55.2	0.97	6.24	6.24	6.24	0.39	2.51	± 12.0 %
1750	53.4	1.49	4.80	4.80	4.80	0.80	2.57	± 12.0 %
1900	53.3	1.52	4.55	4.55	4.55	0.80	2.50	± 12.0 %
2450	52.7	1.95	4.01	4.01	4.01	0.70	1.23	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6– SN:1609 March 19, 2012

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

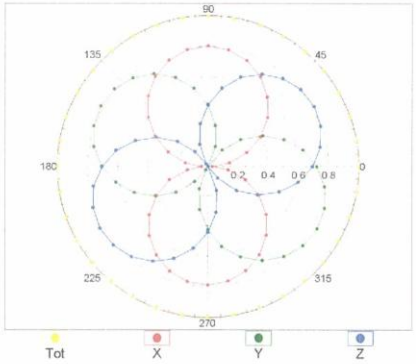


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

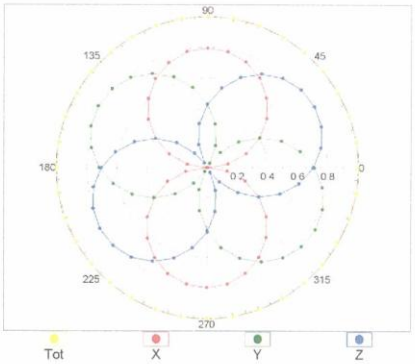
ET3DV6– SN:1609 March 19, 2012

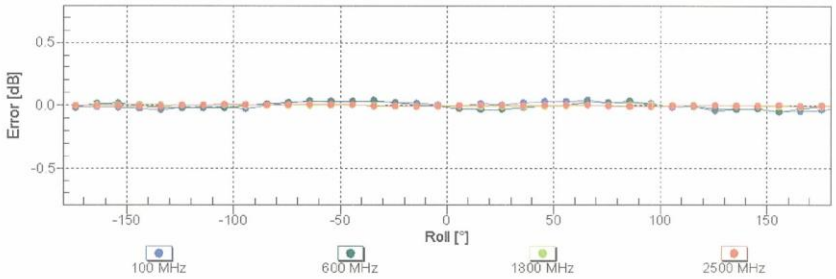
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

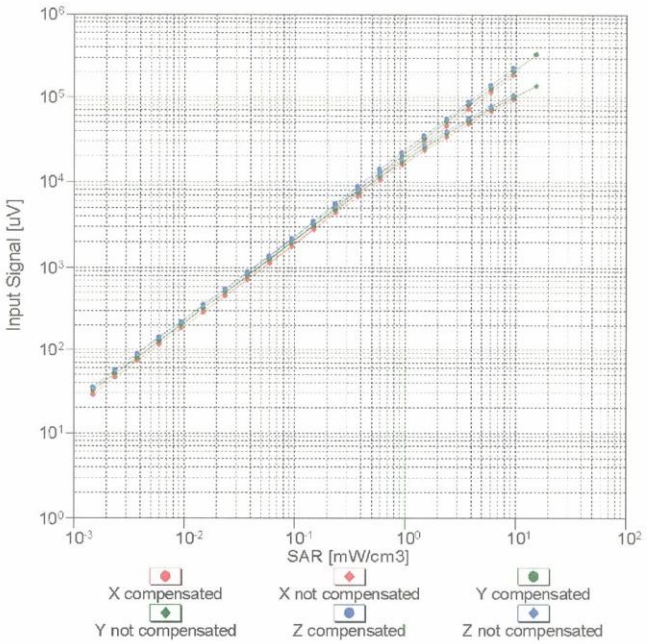


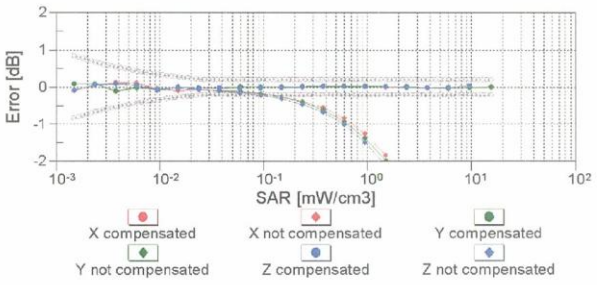


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6– SN:1609 March 19, 2012

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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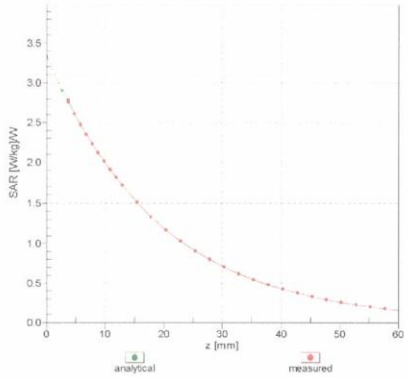
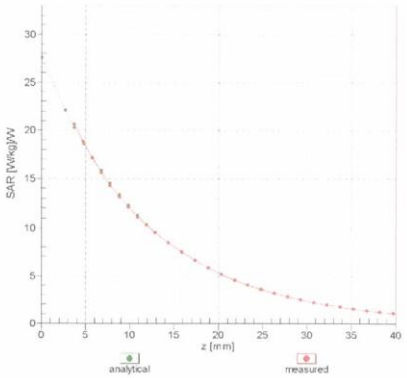
ET3DV6– SN:1609 March 19, 2012

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

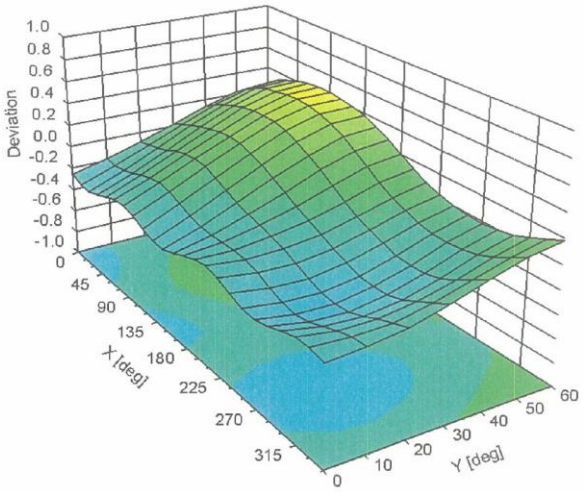


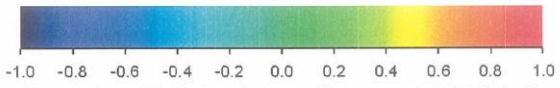
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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ET3DV6– SN:1609 March 19, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

Certificate No: ET3-1609_Mar12 Page 11 of 11

Attachment 4. – Dipole Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Samsung (Dymstec)

Certificate No: D1900V2-5d023_Jan12

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d023

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: January 26, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 26, 2012

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D1900V2-5d023_Jan12 Page 1 of 8

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.66 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.0 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.07 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.4 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.72 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**38.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.9 Ω + 8.1 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.3 Ω + 8.2 jΩ
Return Loss	- 20.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 28, 2008

DASY5 Validation Report for Head TSL

Date: 26.01.2012

Test Laboratory: SPEAG, Zurich, Switzerland

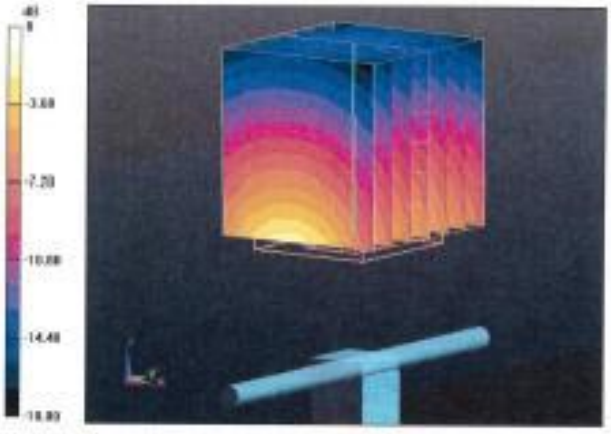
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d023

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.841 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.2900
SAR(1 g) = 9.66 mW/g; SAR(10 g) = 5.07 mW/g
Maximum value of SAR (measured) = 11.991 mW/g



0 dB = 11.990mW/g = 21.58 dB mW/g

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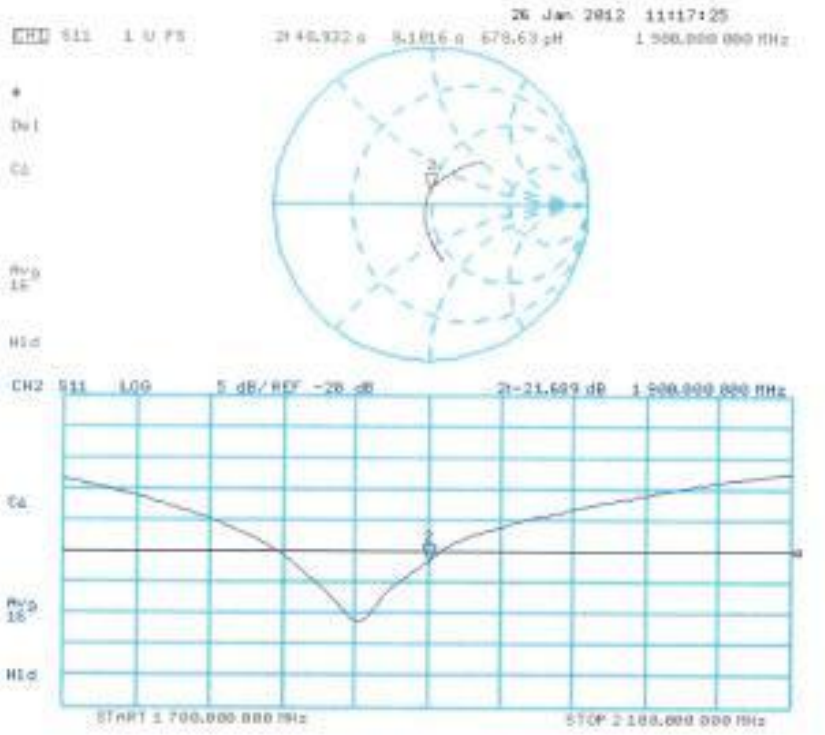
Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d023_Jan12 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 26.01.2012

Test Laboratory: SPEAG, Zurich, Switzerland

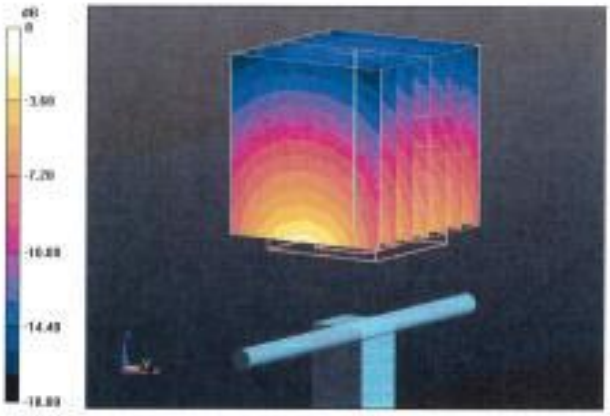
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d023

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.052 V/m; Power Drift = -6.9e-005 dB
Peak SAR (extrapolated) = 17.0640
SAR(1 g) = 9.72 mW/g; SAR(10 g) = 5.1 mW/g
Maximum value of SAR (measured) = 12.349 mW/g



0 dB = 12.350mW/g = 21.83 dB mW/g

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Impedance Measurement Plot for Body TSL